THE RUBBER AGE

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COVERS ALL PHASES OF THE PRODUCTION AND MARKETING OF CRUDE RUBBER AND THE MANUFACTURE AND DISTRIBUTION OF RUBBER GOODS

Vol. 32 FEBRUARY, 1933 No. 9

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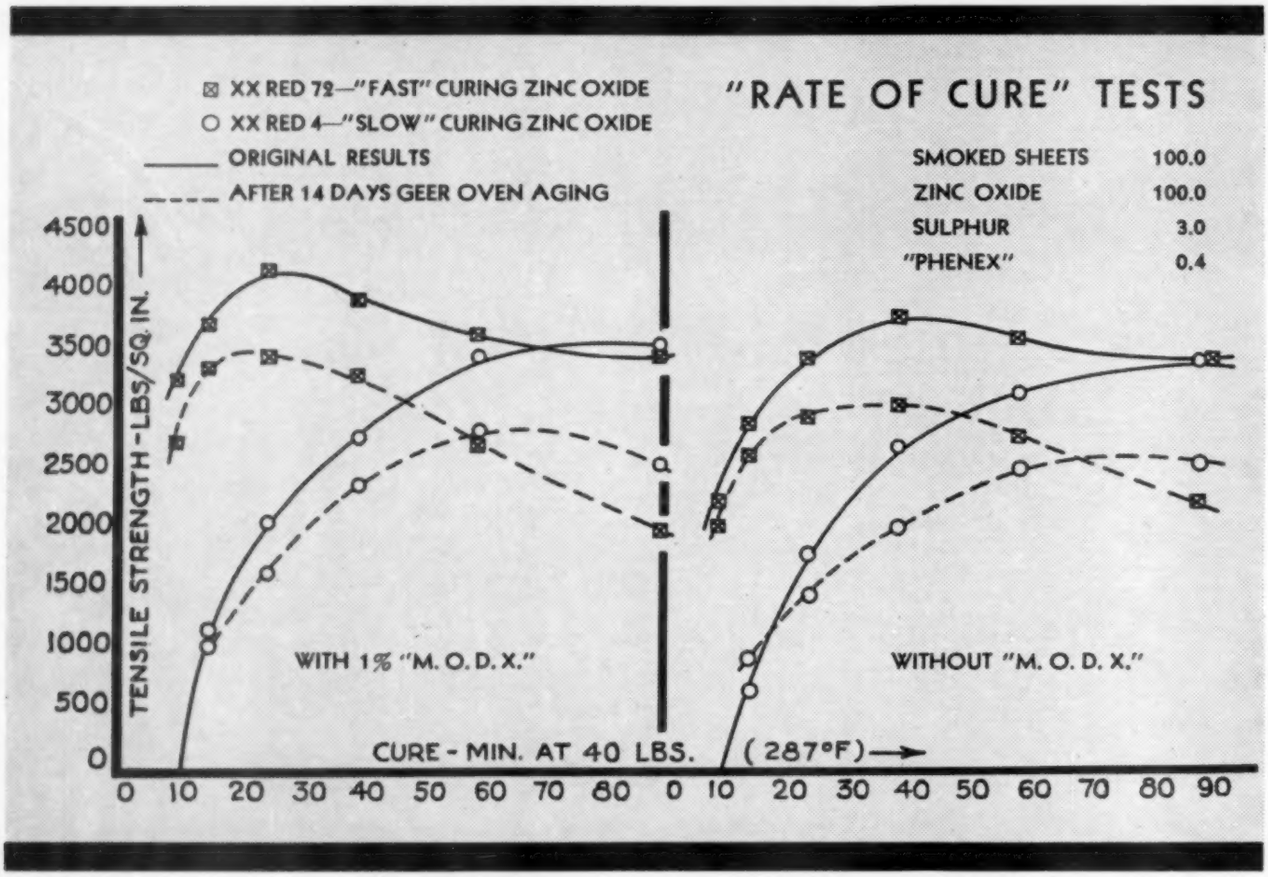
No. 12

of a series of charts showing a comparison of "fast" and "slow" curing zinc oxides with typical accelerators.



NOTE: XX Red 72 accelerates the curing rate of "Phenex" compounds. When used with "M. O. D. X."—a mild activator—the combined activation is apparent. The fact that no cures are obtainable with XX Red 4 in 10 minutes at 287° F. indicates the anti-scorch properties of this type of oxide.

The New Jersey Zinc Company

160 Front Street, New York

New Jersey Zinc

THE RUBBER AGE
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Management Problems in a Small Rubber Company

By NOAH VAN CLEEF
Partner, Van Cleef Bros., Chicago, Ill.

"A smooth running, intelligently managed small rubber company . . ." characterized the field report of the Policyholders' Bureau of the Metropolitan Life Insurance Co., from whose Executive's Service Bulletin this article is reprinted.—Editor.

FOUR BROTHERS determined to go into business together back in 1910, and they are still together. During that period, the business has developed to reasonably substantial proportions without the aid of outside capital. Profits have been well maintained despite present unfavorable business conditions. The beginning represented but a few dollars of the savings of the brothers. They began with the manufacture of rubber cement, and still make it, but many other products of rubber and of a chemical nature have been evolved and manufactured since that time.

All four brothers previously had been employed by others, and in that way had first hand information as to relations of employees to employers. They recognized the fact that such relations ofttimes made for friction, due to the fact that neither side fairly understood the viewpoint of the other. It was decided, therefore, that a relationship would be fostered which would make for mutual respect and interest.

The first step in this direction was to set up a relationship among the members of the firm which would serve as an example and inspiration to those who became associated with the business as salary and wage earners. There was to be no feeling created in this business that anyone was a "boss." For example, men were made to feel that, at the approach of a member of the firm or a department manager, there was no need of starting up guiltily as though they had been doing something for which they would be censured. They might have stopped momentarily to exchange views on the relative merits of a ball player, but that was no reason why they could not bring their conversation to a close in a natural manner.

The Conference Method

In line with the idea of carrying out in a harmonious way the objectives of the business, the members of the firm and department heads, either all together or in groups, hold frequent meetings for the discussion of problems and the making of plans to solve them.

The four partners hold meetings on an average of once a week, each meeting lasting from two hours to four hours, according to the volume of business to be transacted. One of the members acts as the secretary, recording decisions. The carrying out of these decisions is assigned to the partner who is best fitted for the work. In this connection it may be interesting to know that each partner is vested with certain direct responsibilities. Noah handles administrative affairs, Paul is in charge of factory operations, while Maxime and Felix do the field work, representing, principally, sales activities.

Every morning, at eight o'clock, Paul Van Cleef, together with the factory superintendent, William Dermott, the chief chemist, Dr. C. E. Frick, the purchasing agent, Charles E. Wonder, and the traffic manager, William Gerelman, meet in the superintendent's office to talk over the

problems of the day. These meetings are made as short as possible, sometimes not lasting over fifteen minutes, and rarely as long as a half hour. At these meetings such subjects as the need for new equipment, the rearranging of routine, the disposition of special orders, schedules for the day and like matters, are discussed. If the subject is of too extensive a nature for decision at a brief meeting, it is left for discussion either by the members of the firm or at a general meeting of all department heads.

Once every month the heads of all departments, including the office, sales, advertising and credit divisions, meet for the discussion of inter-departmental relations. There are nine people in this group. Miss Katherine Sheehan, of the sales department, acts as secretary, and makes a record of the proceedings. Much benefit is derived from this particular group meeting in that not only do department heads directly concerned in some particular problem find an opportunity of discussing these openly and reaching some satisfactory understanding, but all present learn of activities going on in all branches of the business.

It always has been the policy of Van Cleef Brothers to be on the alert for improvement in its processes or the development of new items. To carry out this policy in a more systematic way, the responsibility for handling ideas along this line has been assumed by the committee on the development of new products. This committee consists of Paul Van Cleef, who, as already stated, has charge of plant operations, the chief chemist, the purchasing agent, and H. D. Wexelberg, sales manager. The last named acts as chairman, while Miss Lillian Fischer serves as secretary. At these meetings, which take place weekly, all ideas gathered from every available source for the production of new products are given consideration. When the committee has completed the consideration of all factors, it submits its findings to the members of the firm, who then approve or disapprove the marketing of the product.

One of the greatest contributing factors toward the cordial relationship existing between the members of the firm and the employees is the Safety and Social Club of Van Cleef Brothers, organized a number of years ago by the employees themselves, without suggestion from the firm. This club has in its membership the entire personnel of the organization.

The Advisory Board meets monthly to discuss subjects brought up by the chairmen of the different committees. The member of the firm on the board, Paul Van Cleef, participates in the discussions on the same plane as all others but is in position to give information quickly which may not otherwise be available at the moment. Every sixty days a general meeting of the entire club is held in the recreation room.

Every summer a picnic is held, and at Christmas time a fine dinner is attended by all. Throughout the year the entertainment committee provides some attractive forms of diversion.

What has been outlined regarding the relations of employer and employee represents to a very great extent the foundation stone for such success in a material way as has been attained by the firm during its twenty-two years in business.

The importance of all forms of insurance is recognized. Group life insurance is carried on the lives of every individual connected with the business. The cost of this is shared equally by the insured and the firm. The lives of the members of the partnership are also fully insured for the benefit of the organization so that no financial complication may arise in the event of the death of one or more members.

Van Cleef Brothers maintain that certain fundamental principles are applicable to the conduct of any business. The mania for doing a large volume of business regardless of sales prices has no place in the establishment of Van Cleef Brothers.

With about 125 people directly dependent upon the success of the business for their livelihood and they, in turn, having many other dependents, it is of vital importance that there be continuity of employment. The members of the firm keenly feel this sense of responsibility and realize that many of those connected with the business, especially those in the more responsible positions, are placing their faith in the management of the business as a basis for feeling that their future is not likely to be jeopardized by the violation of commonsense principles.

"Auto-Tram" Car Wheel

A NEW type of railroad car wheel, involving an extensive application of rubber on engineering principles, has been jointly announced by the Clark Equipment Company of Battle Creek, Mich., and the B. F. Goodrich Company of Akron, Ohio. The announcement follows the introduction of the new "AutoTram," stream-lined motorized railroad vehicle designed by engineers of the Clark Company for use on railway main lines.

Intended primarily for absorption of noises created by contact with steel rails, eight of these wheels have been installed on the front and rear trucks of the "AutoTram" after months of engineering and research effort by the Clark and Goodrich organizations.

Four discs of specially compounded rubber, ¼-inch thick and 1¾ inches wide, are placed in each wheel under lateral compression. The discs have a 23½-inch inside diameter and a 27-inch outside diameter. The load is carried entirely by shear, with no load compression of the rubber.

With these four rubber discs extending upright all around each wheel, radial deflection of the hubs under full load is only about 1/64th inch. This small eccentricity of the hubs causes the rubber in the upper half of the wheel to carry as much load as that in the lower half.

All rubber in these wheels carries its full share of the load at all times. In the usual design of cushion wheels, with the rubber under load compression, only the lower half of the rubber carries the load.

Contrary to previous practices these rubber discs are not vulcanized to the metal. Slippage is prevented and other advantages are obtained by lateral compression of the rubber discs between knurled plates.

When the discs are compressed between the plates there is some relief of strain at th disc edges due to these slipping over one or more knurls while they are being put under compression. This release of stretch provides a softer rubber at the edge, which does not support as much load per square inch as the highly compressed rubber in the center of the disc.

The object of this method is that each disc carries a greater concentration of load in the center of the rubber and with a lower stress at the edges, where failures otherwise would be most likely to start.

The actual shear load on the rubber of the new wheel is only seven pounds per square inch.

The early work on the wheels for this new railroad vehicle was along the line of a pneumatic rubber tire. Work along that line is still in progress by the B. F. Goodrich Company but it seems it is now claimed by the engineers of the B. F. Goodrich Company and the Clark Equipment Company that it is best to retain the long established contour of the standard railroad tire and to provide resiliency by the use of rubber internally.

The Why and How of the RUBBER-TIRED RAIL COACH*

By Col. E. J. W. Ragsdale
Edward G. Budd Manufacturing Company

THE pneumatic-tired railroad coach is the product of two separate developments; namely, a wheel and tire adapted to rail service by Michelin et Cie, in France, and a system of lightweight steel construction developed by the Budd company in America.

Railroads are facing a crisis in operating costs, the urge toward reduction of unnecessary weight has become widespread and the crusade for noise abatement is no longer to be denied. The pneumatic-tired railroad coach not only answers these requirements, but anticipates a demand for a new traveling comfort. It is not merely a bus constrained to run on rails, nor is it a railroad car stripped to accommodate rubber tires. It is a vehicle conceived in the light of a better service and designed without thought of precedent or convention. Seldom has the engineer enjoyed wider latitude.

The desire to rubberize railroad equipment is old and much money has been expended in fruitless experimentation with solid-rubber or cushion tires, foredoomed to failure, for the bearing capacity of rubber is slight compared with that of metal. The rail head is narrow and the load-carrying area can be established only by lengthening the contract. Solid rubber lacks sufficient flexibility; even pneumatics have to be specially designed toward this end. Lateral distortion does not increase the tread as in highway service; in fact, being unsupported, the sides of the tread may cause earlier breakdown of the tire carcass.

Road and rail surfaces present entirely different problems so far as the tire is concerned. The highway abrades tires, wearing down the tread, and is rarely smooth; bumps of widely varying height and character must be anticipated. No uniformity of condition obtains, but the tire is saved by its capacity to distort in any direction. Conversely, the rail is even and smooth. A badly aligned joint such as would wreck a metal wheel makes no impression on a pneumatic tire. Every condition is favorable except the narrowness of the rail head, and this will continue as long as roadbeds must serve the dual requirement of steel and rubber.

As simple as the tire problem may seem in analysis, the solution represents years of courageous and skilful research on the part of the Michelin company. Out of this has been evolved a rail-car tire which has a life comparable with that of tires in highway service and therefore is commercially acceptable; but the work continues, for it is felt that the full possibilities of load or mileage have not been exhausted. The Goodyear company, operating under license from Michelin et Cie, already has made a notable contribution.

*Paper presented before the Society of Automotive Engineers, Detroit, Mich., January 23, 1933. Reprinted with the permission of the Society.

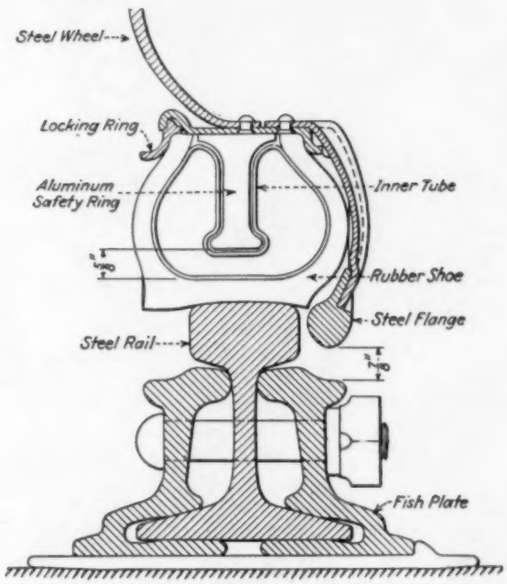


FIG. 1—Cross-section showing tire, wheel and deflation ring

That the present limiting load of 2,400 pounds and the present certain mileage of 20,000 will be extended is fully expected. Rail surface will neither abrade nor snag the tire or subject it to unusual distortion. Further, railroad service permits operation at nearly constant speed; stops are anticipated and need not be abrupt.

The present tire (Fig. 1) resembles a normal high pressure tire but has a slightly flatter tread. It is 35x5½ inches and carries air pressure up to 100 pounds per square inch. The area of contact under load is from 17 to 21 square inches, and side distortion is scarcely noticeable.

Inner tubes are made horseshoe shaped in section to envelop the periphery and both sides of the deflation ring. This ring is attached to the wheel rim and extends well up into the shoe, so that, in event of puncture, deflation will be limited. Each tire carries a pressure gauge attached to the wheel. In France this is connected to an alarm system which notifies the engineer of any pressure below normal.

Wheels are of the conventional Budd-Michelin disk type, but the rim is extended along the inward wall of the shoe and terminates in a standard car wheel flange section. A clearance of ¼ inch obtains between each flange and the rail. The flanges suffer little wear, for rubber hugs the rail head and pneumatic tired wheels do not "hunt" as do steel wheels.

Nothing much happens in case of a puncture. The shoe rests on the deflation ring and holds the wheel flange above

fishplates and other obstructions. A tire-and-wheel change can be made at the first convenient place.

A blowout at top speed produces no untoward results.

Tires do not bounce so as to interfere with flange guidance. There are no bumps to provoke a bounce. The deflation ring stops any deflection of more than ½ inch.

Steel wheels have a coefficient of adhesion varying from 25 per cent. on a dry rail to 9 per cent on a wet one. Pneumatics vary from 60 per cent on day rails to 10 per cent in the case of a dew-coated rail. There is small variation between a dry or really wet track. Provision is made for the use of sanders. Most important, however, is correct design of the tire tread.

Since the tires insulate the car, signal operation has presented a difficult problem. The voltage drop across the track is so low that excellent contact must be established. Even steel-wheeled rail cars do not always operate signals. We have worked out this problem in cooperation with the engineers of the Union Switch and Signal Company and have arrived at a satisfactory solution. Contact with the rail is established through wire-brush blocks mounted between the wheels on both sides of the car.

In France the rail vehicles show a strong bus tendency in design. The passenger load is relatively small, the appointments required are meager, but the speeds are very high. In this country we have felt that a rail-bus answers neither the demand of the traveling public nor the ideas of railroad management. While a cheaper mode of transportation is indicated, that cheapness dare not be obvious. The high cost of rail transport has not been chargeable so much to luxurious equipment as to a type of equipment that is too costly to operate. Correct the latter and the luxury may stay; curtail on accommodation and comfort, and the passenger volume that still remains will drift to other modes of transport.

Thus far, four coaches have been put into service in the United States and twenty-eight in France. Others are under construction. They vary somewhat to accommodate the conditions of their intended use, but all have in common the dual concept of more comfortable transportation at lower cost of operation. The principle is applicable to self-contained units operating under their own power, individually or in trains, or to trailers to be attached to conventional locomotives.

Lightness is the watchword in every case. Pneumatic tires require it; economy of operation makes it an absolute necessity. The empty weight varies from 480 pounds per passenger for a Diesel-electric-driven unit to 350 pounds for a trailer. But in no case can this be attained at the cost of safety. Railroads do not compromise in this respect. Collision effect is a direct function of mass. Extra weight aggravates the force to the same extent that it tends to resist it. The pneumatic tired rail coach, while subjected only to proportionate shock, is constructed to withstand many times this shock. A new development in stainless steel structures has offered the answer.

The Reading-65 was designed for general utility rather than for some specific service. It seats forty-seven passengers and operates through city streets as well as over the main right of way. It contemplates a possible one-man control and a certain demand to run in either direction with equal facility. Double-end operation and one-man control eliminate mechanical drive; Diesel-electric power is indicated. Street operation establishes a turning radius of fifty-five feet and restricts over-all length. This means the mounting of the power plant beneath the floor. Engine, generator and battery are incorporated in one truck, the driving motor in the other. Railroad operation, with possible high-platform loading, fixes floor height and necessitates traps over the step well. Doors, traps and folding steps, in view of one-man control, must be air operated from each end. The seats are reversible. With this outline the picture begins to clarify, and a tentative weight analysis can be made. It sums up:

	Wt., Lb.
Body, complete	8,200
Engine, Generator and Motor	5,500
Trucks	5,000
Accessories and Signal Equipment	2,000
Car Weight, empty	20,700
Passenger Load	6,580
Total weight	27,280

Allowing 2,400 pounds carrying capacity for each of the twelve tires, the total permissible weight becomes 28,800 pounds. Then, with the weight and a tentative layout of the car established, the speed and acceleration are determined. These figures at 48 m. p. h. when the gearing provides for an acceleration of 1¼ m. p. h. per sec. This is acceptable, since the service conceived involves frequent stops. A high top speed is not desired, but good starting and stopping qualities are needed for general service.

A 125-horsepower Cummings engine is suitable for the requirement. It delivers 72 horsepower to the axles after deducting electric losses and all power consumed by auxiliaries. This gives a comfortable margin for reserve.

With weights of engine, generator, motor and batteries fixed, drastic reductions are indicated for all other elements. Most phenomenal, perhaps, is the design of the truck frames. One of these has to carry 7,000 pounds of power equipment, including engine, generator and storage batteries, to say nothing of supporting also one-half the body weight and passenger load. Actual weight of the frame is only 285 pounds. Careful analysis and distribution of forces resulted not only in a frame many times lighter than those of conventional design, but having factors of safety far exceeding any possible requirement. There can be no excess metal; every ounce is made to count. Wherever a stress line occurs, an appropriate stainless-steel member is built in.

The body always demands the most intensive study. Weights would run riot if not checked. This is particularly true of appointments and fittings. The main structure represents only 9 per cent of the total body weight; seats, even after drastic treatment, account for 15 per cent. Glass and cork floor tiling run into large figures. One partition and door weighs more than the sum total of all floor beams. Air engines for operating the doors and traps are twice as heavy as the doors they operate. The horn weighs twenty-five pounds, and there are two of them.

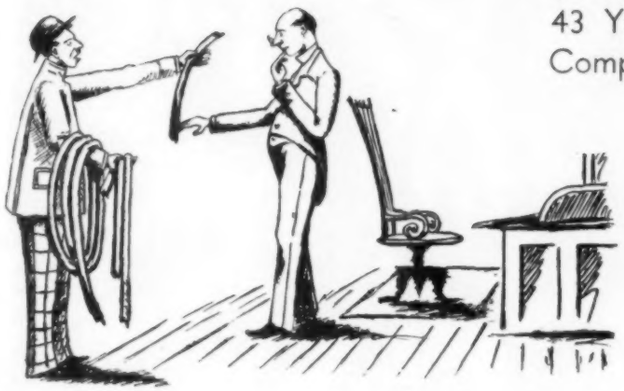
The Budd construction departs from customary practice in that the side paneling plays no part in the main structure. This at first seems inconsistent with economy of weight, but actually does not prove so. The outer paneling is fluted, which not only adds to the appearance, but prevents its being stressed.

In other cars under construction, the roof becomes a main strength-member and is most effectively utilized. There, however, it is possible to tie it into the lower portion of the car by suitable shear members. Steel roofing and floor, if correctly designed, can be not only lighter than those of soft materials, but can add materially to strength and safety. Further advantage accrues by tying the floor the draft gear.

Stainless steel not only offers unusual physical properties, but, through its resistance to corrosion, permits the use of very thin gauges. Its economical application results in quite unconventional shapes and sections. A mere substitution for ordinary steel accomplishes nothing but needless expense.

Advertising "Hydrant Hose" in 1890

A Circular Advertising Garden Hose 43 Years Ago Offers an Interesting Comparison With the Customary Circulars of Today



UNDER the title, "Queries and Suggestions Concerning Hydrant Hose," an old-time circular has recently come to light in the files of the B. F. Goodrich Company. To our modern minds, accustomed to attractive illustrations, layout and readable copy, this circular proves of more than passing interest. To customers of 1890, when the circular was printed, it undoubtedly had a distinct appeal and it was probably in keeping with other circulars and advertising matter of the day—the forerunners of the concise and attractive sales literature of today.

Imagine today a perplexed dealer, seen in one of the accompanying illustrations, tempted to "pronounce able-bodied anathemas upon those who make such 'stuff'", (the "stuff" being the "disreputable looking bundle of hose" hanging in several pieces on the arm of the irate customer). Or perhaps you can conceive yourself in the habilments of the distinguished gentleman watering his plants,—frock coat (?), silk hat, n' everything!

The text of the complete circular is given herewith:

Candidly, within the past five years, have you not made emphatic derogatory remarks about worthless hydrant hose that is always giving trouble? Perhaps you have more than once experienced the intense financial satisfaction of sacrificing the entire profit on a few bales, more or less, for the sake of pacifying some irate customer, who, in a disheveled and bellicose condition has unceremoniously invaded your private office, dragging a disreputable looking bundle of hose, which he vociferously insisted upon being replaced forthwith. At such delightful seasons have you not been tempted to pronounce able-bodied anathemas upon those who make "such stuff"? Don't you think it is about time that a reform movement was started, having for its watchword "Down with cheap hose"?

Seriously, would not the consumer be far better off and would not the dealer ultimately do a much more satisfactory and profitable business if nothing but first-class hose were sold? The man who takes out the hose he bought last season in the comfortable anticipation of the fun he is going to have sprinkling his lawn or flower bed is not apt to consider such hose a profitable investment or to say complimentary things of the dealer from whom he bought it when it bursts in a dozen different places the first time the water is turned on. This is especially the case if, after he has donned dry clothing and is marching in hot haste behind a wheelbarrow, on his way to interview the unfortunate merchant, he witnesses the self-satisfied and tranquil condition of his neighbor who has been wise enough to invest in a good article.

Have you not considered the advisability of handling at least a small amount of good hose that you can thoroughly recommend? If so, we hope to interest you in our

WHITE-ANCHOR AND EXTRA-WARRANTED BRANDS

both of which are offered solely upon the ground of quality instead of cheapness.

All the materials we use in the manufacture of White Anchor are the finest of their kind. The tube or inner lining is made of fine Para 2½ inch fire engine hose, and is compounded with especial reference to resisting wear. The duck is twelve ounce, woven by the Mount Vernon Mills at Baltimore.

We guarantee *White Anchor* against defect of material or manufacture, and if fairly treated it will last for years.

Extra Warranted is a strong, durable hose that is guaranteed to do satisfactory service if not abused. It is very carefully made of excellent stock. There is nothing better in the market, *White Anchor* excepted.

The first cost of both of these brands is necessarily high in comparison with that of "One Summer Hose," but when

durability is taken into consideration it is not difficult to see where real economy is to be found.

We feel sure that if you made even a few sales this season of *White Anchor* or *Extra Warranted* you would have a considerable demand next year. If you would like to see samples please advise us and they will be sent promptly with quotations.

We sincerely trust this circular will impress you favorably and that we shall have the pleasure of hearing from you soon.

A SAFETY DRAMA —"Court of Inquiry"

• Being a Safety Playlet Presented by the Akron Group of the Rubber Section, National Safety Council at the Recent Annual Meeting Held in Washington, D. C.

THERE is a real story behind this interesting drama—and it is put over more effectively in the form of a playlet than in the usual style of a trade paper story. It has a plot, with moments of pathos—a climax and a solution. We feel that the lesson this story tells should be brought home to everyone in any way connected with safety in rubber factories.—EDITOR.

Cast

Plant Manager	H. W. Low, Miller Rubber Co.
Chief Engineer	J. O. Lee, India Tire & Rubber Co.
Safety Engineer	W. L. Schneider, B. F. Goodrich Co.
Foreman	J. T. Kidney, Goodyear Tire & Rubber Co.
Witness	B. F. Gerpheide, Goodyear Tire & Rubber Co.

Scene: Plant Manager's Office

LOW—"Well, boys, are we all here?"

SCHNEIDER—"All but Jack Kidney; he was notified that the meeting was scheduled for 1 o'clock."

LOW—"We'll wait a few minutes."

KIDNEY (*enters*)—"Hello, everybody."

LOW—"Jack, didn't you know that this meeting was called for 1 o'clock?"

KIDNEY—"Yes, but I got into an argument with the tire department who were trying to blame their troubles on dirty stock. They're always trying that trick."

LOW—"Never mind the alibis—we all have other duties. Do you realize that you have kept us all waiting for 15 minutes when we should have been getting something done. In the future I will expect you to be prompt at all meetings. Now I have been going over our accident figures and comparing them with some of the other plants in our industry. I find, that while we are not the worst in the list, we are a long way from the top of the heap.

"I called this meeting to investigate thoroughly the accident which occurred in the mill room this morning, as I believe a thorough investigation of this particular case may bring out some of the things which are keeping us from the top of the list.

"Walter, let's hear what you have learned so far."

SCHNEIDER—"I have the foreman's report here which really doesn't tell us much, but I will read it. 'Harry Jones—caught right hand in mill while mixing stock—safety worked O. K.'

"Jack do you have anything to add to this?"

KIDNEY—"No—the whole story is there just as I wrote it."

SCHNEIDER—"You say the safety worked O. K. Just what do you mean by that statement?"

KIDNEY—"Just what it says—I wasn't there at the time but I asked the boys if the safety worked O. K. and they said yes."

SCHNEIDER—"Mr. Lee, your department tests the safeties; what is your report?"

LEE—"Here is a copy of the routine test made at the beginning of the shift this morning. You will note that the mill stopped with 9½-inch of roll travel which is well under the national standard of 16 inches for a 20 x 60 mill. After the accident I personally checked the safety. The roll travel was 9 inches even."

SCHNEIDER—"Thank you for the report, and I may add that your department has kept the safeties in excellent condition.

"We have a witness here, Mr. Gerpheide, who was working on the mill next to Jones, and I am going to ask him to tell us what he knows of the accident."

GERPHEIDE—"Well, I was working on my mill batching out stock when I heard a yell. I reached up and pulled my safety as I had been taught at the Stretch Rubber Company. I looked over and saw Jones with his hand in the mill. I looked for the foreman but he wasn't around, so I called to another mill man and the trucker. They ran to the tool cabinet and got the tools to open the mill, while I cut the rubber away from Jones' hand."

SCHNEIDER—"Just a moment, Gerpheide. Will you explain just what you mean by being taught at Stretch Rubber Company?"

GERPHIDE—"Well, I worked at Stretch Rubber Company for three years before I came here. They had drill teams organized in the mill room and held drills about once a month. Each man had some specific job and was taught just what to do. We used to have the rolls opened in less than two minutes after the safety was pulled and the alarm given. In making the daily tests on safeties the mill man

always pulled the safety so that it became a habit with us."

SCHNEIDER—"Thanks. That sounds very interesting. Now go on with your story."

GERPHEIDE—"We started to back off the adjusting screw but had a hell of a time with it as it was rusted in. We bent the bar trying to get it loose."

SCHNEIDER—"You say the screw was rusted in?"

GERPHEIDE—"Either that or pigment had sifted around the threads which would make it stick."

LEE—"Those screws are supposed to be lubricated regularly and I will check-up and see that they are in the future."

SCHNEIDER—"Go ahead, Gerpheide—what happened next?"

GERPHEIDE—"Well, we finally got the screws backed off and then found that the sledge was missing from the cabinet. We had to pound the wedges between the rolls with the bar used on the adjusting screws and the safety breaking cap. This was pretty slow work and Jones fainted before we could get him out of the mill."

SCHNEIDER—"Jack, where was the sledge which belongs in your emergency tool kit?"

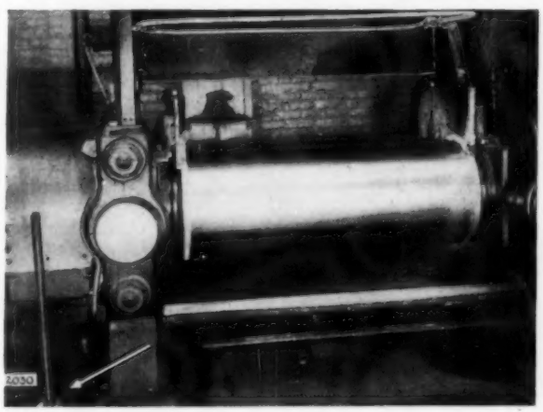
KIDNEY—"How in hell do I know. You fellows put those kits up and it's your job to see that they are all there. I've got plenty to do without bothering with your job while you sit on your 'tail.'"

SCHNEIDER—"I resent that! The inspection of the equipment in the department is up to you men who are right there on the floor."

LOW—"I will back Walter up on that—the foreman is responsible for keeping the equipment in his department in shape."

KIDNEY—"All right if you feel that way about it, but I don't know what happened to the sledge."

GERPHEIDE—"I believe I know what happened to the sledge. A couple of weeks ago I saw one of the mechanics get it out of the cabinet when they were working on No. 2 Mill Line."



A Fully Guarded Rubber Mill

The safety trip at the top is an improved type in that it has no center bar. When the mill operator pulls or pushes either the front or rear bar of this trip, the mills stop turning. The distance the rolls travel after the safety is tripped depends upon the efficiency of the brakes. A weekly inspection of brakes, both when mill is loaded and when it is empty, is recommended by the National Safety Council. The arrow in the left lower corner points to an additional safety device for the rubber mill. This is a holder for the heavy bar which is used to tighten and loosen the mill rolls. When the bar is placed in the holder instead of being leaned against the side of the mill, the hazard of its being knocked over on the mill operator's feet is eliminated.

LEE—"Are you sure it was a mechanic?"

GERPHEIDE—"Yes, it was a mechanic alright."

LEE—"I'll find out about it right now! (*Grabs phone and calls maintenance foreman's number.*) Shorty, I just learned that one of your men took the sledge out of the emergency tool kit in the mill room. Who was it? Will you find out who took it and call me back in Mr. Low's office?"

LOW—"Thanks for your help Gerpheide and if you have nothing further to add we will excuse you. I want you to know, however, that we appreciate the way you kept your head in the emergency. You did a nice job."

GERPHEIDE—"Thank you." (*Goes out.*)

SCHNEIDER—"Jack, you made the statement before that you weren't in the department when the accident occurred. Where were you?"

KIDNEY—"I don't know as it is any of your damned business, but I was in the pool room across the street getting some chewing tobacco."

LOW—"From the looks of your department the last time I was through it you would do much better to cut out the chewing entirely. The place looked like a pig pen. That probably accounts for most of your dirty stock problems."

SCHNEIDER—"How did you first hear of the accident, Jack?"

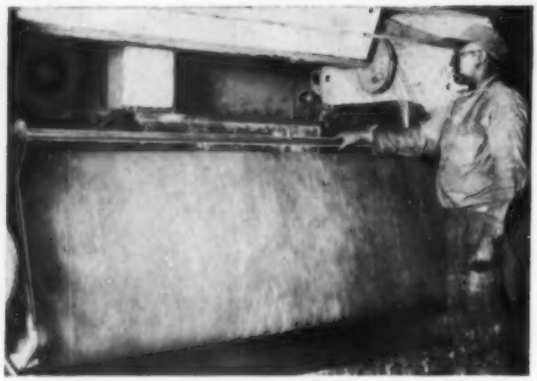
KIDNEY—"When I came back the watchman told me they had taken one of my men to the dispensary. I beat it right over to see what happened and then went back to the department and filled out your report."

LOW—"Just a minute, Jack. You were out of the department when the accident happened and you say the watchman told you they had taken one of your men to the dispensary. From the evidence here it took 15 or 20 minutes to get the man out of the mill so you must have been out of the plant at least that long and probably longer. How do you expect to operate a department like that? You just made the statement that you had plenty to do without checking equipment in your department, now I find you leaving the plant for half an hour to loaf in a pool room. If I hear any more of this I can assure you that you will have plenty of time to loaf with nothing to do."

(*Phone rings. Low answers and passes instrument to Lee.*)

LEE—"You say Rogers took the sledge while working on No. 2 line and then put it on the truck with the rest of the tools when they got them? Oh, it's been in the tool crib ever since, has it? Well, you give that 'bird' a week off. There is no excuse for taking anything out of the tool kit in the Mill Room, for it is very plainly marked 'For Emergency Only.' Furthermore, it doesn't make you look too good to have a man working for you as long as Rogers has and still pull a trick like that. It doesn't make any difference whether you were personally on the job or not—it's your job to train your men to follow instructions. A man properly trained would never have taken anything out of that tool kit. You give him a week off and do some safety thinking on your own account. (*Hangs up.*) I'm not trying to excuse my own men, but I would like to bring up a subject that was up about a year ago. There is a new type of back-off screw which is bolted onto the roll neck so that when the screw is backed off the roll follows it. This does away with the necessity of the sledge and wedges and would eliminate the possibility of human error which we have had here. I put in an order about a year ago to equip our mills with these screws and never heard from it. I don't remember the figures, but it would probably cost less now than it was a year ago."

LOW—"I don't recall the other order, but you go over your figures again and let me have the order. If the cost isn't prohibitive I will put it through. Walter, do you have anything else?"



Mill With Improved Safety Bar

This photograph shows an improved safety bar over the apron on an 84" mill. This bar, on which the mill man's hand is resting, is used as a stabilizer for the "hockey sticks" supporting the apron roll. Formerly this bar was supported by bearings of such a design that there was practically no clearance between the moving apron and the bar. This caused quite a few serious injuries due to the mill man's hand being caught between the moving apron and the bar. The simple remedy was to change the bearings so that there would be sufficient clearance between the apron and bar. (National Safety Council.)

SCHNEIDER—"Yes, I went out to Jones' home to tell his wife and from what I saw I don't think the home conditions are all they should be. They have two children, a boy of 9 and a girl of 6, and did have a fairly nice home. Mrs. Jones has been sick for several months and not able to keep the house as it should be and look after the children at the same time. Between the sickness and Jones' reduced earnings, on account of slack work, they have been pretty much up against it financially. After I had assured her that Jones' injury was not fatal or permanently disabling, Mrs. Jones was quite worried as to how they would get along. I assured her that the company policy was to give her husband the best of care and as soon as possible would put him back to work at something where he could earn a livelihood."

LOW—"Thanks, Walter, for explaining our policy and doing all you could to lessen the shock. I will have the doctor drop around and see her—perhaps he can do some good. If they are up against it financially, we can probably arrange to advance some compensation. As soon as he is able we will find something for Jones to do. That is your job, Jack. It's up to you to find him a job in your department where he can earn a fair wage."

KIDNEY—"I'll find him a job, alright. He was only transferred to my department a few months ago. He was inspector of some kind up in the press room 'til they got slack. Maybe I can make an inspector out of him."

SCHNEIDER—"That brings to mind another point, Jack. Just how much instruction did he get when he came to your department."

KIDNEY—"What do you mean instruction? He has been around this shop for years and ought to know his stuff by now."

SCHNEIDER—"That's just it—he may have been an old employee but he was 'green' on your job and should have had just as much attention as a man right off the farm. If you had gone over the job with him and pointed out the hazards and seen to it that he followed safe practices, I don't believe he would ever have reached into the mill after his knife when it was jerked out of his hand."

LOW—"The most striking part of this whole investigation to my mind is the number of places in which our supervision has fallen down. It has certainly opened my eyes. I have been sitting back thinking that because we had hired a safety engineer our troubles were over. I admit that I haven't given safety any active support. From here on I am going to make it a part of my job, and am going to insist that everyone else in this plant do the same thing. I have been reading and hearing a lot about foremen's training and I am going to go into it and see what we can do along that line. We certainly need something. As far as this particular case is concerned the worst part is the fact that we have made Jones a cripple and he will have to go through the rest of his life with a maimed hand. From a company standpoint, Walter has given me some figures on the probable cost of the injury. These should interest you: direct cost (medical and compensation), $1,500.00; indirect cost, $6,000.00; making a total of $7,500.00. Walter, will you explain just what is included in this indirect cost?"

SCHNEIDER—"That is based on a nationally accepted figure of four times the direct cost. This figure was determined as the result of a survey of thousands of cases conducted by the Traveler's Insurance Company. The indirect cost includes such items as spoiled materials, broken equipment, loss of production, upset schedules, time spent in investigation, etc."

LOW—"Well, if they have gone into it as thoroughly as that I suppose we will have to accept their figures. On that basis the cost to the company is $7,500.00 I wonder if you men all realize that this is equivalent to 6 per cent net profit on $125,000.00 worth of business which is mighty hard to get in these times. All we have to show for this $7,500.00 is experience and, believe me, we are going to cash in on that experience and do all in our power to prevent a repetition of this affair. The meeting is adjourned."

(*All leave except Low.*)

KIDNEY (*returning*)—"Mr. Low, I realize that I was the 'goat' this afternoon and I guess I had it coming, but I came back to tell you that I learned something from this meeting. I always thought that safety was Schenider's job and I didn't bother myself about it. This meeting today showed me that it is really part of my job and I am going to take care of my end of it from now on. I'll probably make some mistakes for I admit I don't know much about it."

LOW—"Jack, if you adopt that attitude I am sure you will get somewhere and as far as specialized knowledge is concerned, that's where Schneider comes in. He can't be everywhere and look after all the safety problems in the plant and that is each of the foreman's job. However, when you are not sure of the safest way to handle a particular problem, call Schneider in on it and all his specialized knowledge of safety is at your disposal. If you work with him in this way I am sure you will lick any safety problem that comes up.

KIDNEY—"I never looked at it that way before, but I see it now and you can depend on me to do my share from now on."

LOW—"That's the spirit, Jack; go to it."

(CURTAIN.)

Rubber Sleeve for Grinders

A PATENT (U. S. No. 1,886,546) was recently granted to John R. Hoffman of the Madison-Kipp Corporation, Madison, Wis., for a governor on a pneumatic grinding tool, embodying a rubber sleeve which is controlled by centrifugal force to prevent racing of the tool and possible breakage. When the spindle slows down the rubber sleeve assumes its normal shape and the tool again resumes its operating speed.

Varnishes in Rubber Footwear*

By D. D. Wright
Hood Rubber Company, Inc., Watertown, Mass.

THE object of this paper is to explain the physical requirements for varnishes and lacquers for rubber footwear, the difficulties that are encountered and the new properties desired. To many varnish and lacquer chemists the problem of successfully adapting a varnish or lacquer to a rubber surface may simply imply that the most elastic and flexible varnish or lacquer available could be used. However those films that are entirely satisfactory on the most flexible sheets of metals are found, almost without exception, to be too brittle for rubber. The problems met in securing entirely acceptable films are numerous, and a perfect film has not yet been produced. That which can be said for rubber footwear can also be said for almost all other kinds of rubber articles.

Purpose of Applying Varnishes or Lacquers

Briefly, the purpose of applying varnishes or lacquers to rubber footwear is to produce and maintain a better appearance for both display and wear, to create decorative effects, and in some cases to produce a quality sensation to the touch. Only certain types of boots, shoes, and gaiters are varnished. The remaining types are made dull or glossy by choice of proper ingredients and methods of vulcanization. However, the natural finish, though good, tends to mar easily and picks up dirt too readily. The oldest example of varnished footwear is that of the low "rubber" or gum shoe.

In the last few years a rapid evolution in style and compounding practice has taken place.

Changes in Varnish Due to Changes in Rubber Practice

In earlier years footwear recipes almost exclusively used litharge to accelerate the vulcanization (or combination of sulfur with the rubber). The rubber was composed almost entirely of the wild sorts. The time required for vulcanization usually averaged about 7 or 8 hours under atmospheric pressure at temperatures grading up to 125-140° C. Of late years litharge has been largely replaced by zinc oxide and organic accelerators. The better grades of plantation rubber are now used, wild rubbers being almost entirely eliminated. The heats have been shortened to about 2 or 3 hours, and the usual temperature is in the neighborhood of 125° C. Most varnished footwear is now cured in air under pressure.

These changes in practice have necessitated changes in varnish recipes. Rubber compounding ingredients such as softeners, reclaims, resins, pigments, accelerators, and antioxidants usually may be found to have some influence on the behavior of the varnish or lacquer. In line with increased attention to modern style and color vogues, the conventional black varnish has been supplanted to some extent by clear or by pigmented varnishes and lacquers which do not detract from the color of the rubber over which they are applied. A few years ago the lacquer that would not discolor or craze badly when applied to rubber was practically unknown. Today, there are several which demonstrate the value of continued research.

Methods of Application of Varnishes and Lacquers

Nearly all varnish is applied to the rubber before vulcanization. Because of their quick-drying properties, lacquers have been developed that may be applied either before or after vulcanization. Wherever possible, articles of footwear are dipped. However, some structural feature often causes the appearance of run-backs which may be avoided only by a different method of application, such as brushing, sponging, or spraying. When light colors are desired, this trouble is more pronounced. A varnish with a low color number, even when it is subjected to vulcanization, is much needed.

Types of Varnishes and Lacquers Used

VARNISHES. One type of varnish is made by sulfurizing an air-blown linseed oil. Rosin gilsonite, kapak, oil black, and other materials are incorporated to give gloss and color. A small amount of a suitable drier is essential for a surface free from tackiness. The finished varnish is thinned with turpentine and V. M. & P. naphtha to the specific gravity that will produce the desired thickness of film. The air-blown oil usually has a specific gravity of 0.960 to 0.965 at 15° C. This is heated with 4 to 10 per cent of sulfur in a steam-jacketed kettle which is provided with a stirrer. The time and temperature, as well as the concentration and method of adding sulfur, vary among various makers. The important step in the procedure is to stop the sulfurization at the right point just before gelation takes place. A "string" test or flow test is used to determine this point.

Another method of making the varnish is that in which the linseed oil is fire-cooked and subsequently sulfurized. In the cooking, the oil may be heated to approximately 275° C., and thus gilsonite or fossil gums may be satisfactorily incorporated. This varnish gives a tougher film than that made from air-blown oil but in many cases it does not wet the rubber surfaces as well.

By both of the above methods a dark colored varnish is obtained. A clear varnish of light color may be obtained by vulcanizing the oil with sulfur chloride in much the same manner as in making a white factice.

Colored varnishes, which are not true enamels, are made by blending into pale varnish, paste colors which have been given an extremely fine grinding in a proper vehicle. The colored varnishes are subsequently thinned to the proper consistency. By the cut-and-try method, a procedure of handling these varnishes is found which compensates for settling of pigments and obtains the desired color balance.

LACQUERS. The formulation of lacquers is an art that

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will not be discussed in this paper. It may be well to mention, however, that pigmented or clear lacquers may be required to give either flat or gloss finishes on footwear. The clear lacquers are in greater demand, although it has not been necessary to use them extensively on rubber footwear.

Physical Properties Required of Varnishes and Lacquers

Some mention has already been made of the physical requirements, such as color, gloss, easy shedding of dirt, flexibility, and elasticity. To give a clearer idea of the properties desired in a varnish or lacquer film, it is well to review the conditions that rubber footwear must withstand.

PACKING. The articles are usually wrapped in pairs in oiled tissue paper and folded or compressed to some extent as they are packed into pasteboard cartons. Therefore, the varnish must not be so tacky that it will adhere to or be injured by the wrapper. It must not pick up lint from the carton. On the other hand it must not be so dry that during normal storage and shipment it will develop cracks where it is folded or wrinkled. It must also age well.

LIGHT EXPOSURE. Varnished footwear is frequently exhibited in shop windows, and, therefore, the varnish or lacquer should withstand a reasonable exposure to light.

WEAR. When worn, varnished rubber footwear is subjected to sharp flexing and chafing actions at various points. Light footwear is also stretched to quite a degree. On some parts of an article this stretch may amount to almost 300 per cent. The varnish or lacquer film should have sufficient adhesion, flexibility, and elasticity to withstand a reasonable amount of flexing and chafing. It should not crack, craze, or check prematurely. During wear, the article is usually subjected to the abrasive and weathering actions of snow, ice, water, mud, and slush. The finish should withstand all these elements, as well as extreme changes from cold to warmth, without quickly acquiring an unsightly appearance.

TESTING. Laboratory tests, that are commonly employed to detect poor varnish, consist of those which determine the resistance to flexing, stretching, light, and oxidation. The oxidation test is made in the Bierer and Davis oxygen bomb. These tests are made on footwear sections or on sheets of compounded rubber that are carried through the processing in the usual manner. Laboratory tests are supplemented by actual wearing tests. Those who wear the articles are required to walk a stipulated distance each day over an established route.

Difficulties Encountered

Various production troubles are encountered with varnishes and also with lacquers.

PITTING. This is usually caused by poor wetting. Waxes or fatty acids that bloom out on the surface are sometimes responsible. Certain pigments may also cause this trouble. Both varnish and rubber must be clean.

TACKINESS. This may be the result of several conditions—namely, undercooked varnish, lack of drier, excess drier, shortened vulcanizer heats, heavy films of varnish, errors in addition of rosin, or changes that may have been made in the rubber recipe.

SILVERINESS. Metallic or organic vapors in the vulcanizer may cause this trouble. Impurities in the varnish may be to blame. Thin varnish films occasionally show this defect. Moisture is troublesome. It may come from the stock, compressed air, or steam leaks. Litharge will cause silveriness when moisture or certain fatty acids are present.

CRACKING. This is essentially due to poorly prepared varnish. All solid materials must be exceptionally fine, well dispersed, or dissolved. Colored varnishes cannot be bulked much with pigment. Overheating of the varnish or oil invites trouble. Certain organic accelerators of rubber, such as the guanidines, are strong driers and increase the tendency of some varnishes to crack more readily. As thickness of film is increased, the film must be more elastic and flexible.

POOR ADHESION. Certain compounding ingredients, such as waxes or fatty acids, may bloom out of the rubber and cause poor adhesion. Humid weather, hard or dusty surfaces, poorly formulated varnish, or rubber, etc., should be considered.

COLOR. When an unusual color develops under a given set of conditions, the varnish may usually be found to be at fault. Most varnishes and lacquers darken considerably during vulcanization and may easily vary in this respect. A slight variation in thickness of film under these circumstances will give a marked color difference. On the other hand, when rubber recipes are altered, samples should be varnished and tested for color. It is true that two unvarnished red stocks may look alike and yet have entirely different colors when they are varnished. This is true because numerous extractable materials that do not contribute noticeably to the color of a rubber stock may be taken up by the varnish solvent. Modern black stocks are requiring blacker varnishes because of changes in compounding practice.

OTHER TROUBLES. Seasonal changes in room temperature and humidity have to be watched closely so that steps may be taken to avoid pitting or tackiness that may arise because of their influences.

Lacquers do not give so many application troubles as varnishes, but are more or less influenced by the nature of the rubber stocks and surfaces on which they are applied. For instance, lacquers that have been known to be satisfactory on one rubber stock have been found to become either softer or more brittle on other rubber stocks.

New Properties Desired

In conclusion the writer wishes to point out that great improvement can still be made in varnishes and lacquers for rubber footwear and other articles of rubber. The ideal film is one which fulfils the following requirements:

(1) Forms a perfect bond with practically every rubber stock.

(2) Possesses the great elasticity, flexibility, tensility, and toughness of rubber.

(3) Enhances the outward appearance of rubber articles.

Book Review

SELLING BY EMPLOYEES. Policyholders' Service Bureau. Metropolitan Life Insurance Company, New York City. 24 pp. For free distribution.

The booklet is a digest of the employee-selling experiences of 87 retail, wholesale, service and manufacturing organizations using factory, office, and other employees to get business.

The first part of the report summarizes the experience of various companies which have adopted employee-selling program, and outlines the methods taken to insure the cooperation of the personnel. Part II presents in some detail a few typical plans. The report concludes with a list of references which may be useful to those wishing to draw up a plan for themselves.

SUCCESSFUL SALES IDEAS of a Small Tire Company

By John W. Whitehead
President, Norwalk Tire & Rubber Co.

THE Norwalk Tire and Rubber Company, Inc., in each of the fiscal years ending September 30, 1931 and 1932, reported substantial profit, whereas sizable deficits were usually the rule during the four or five preceding years. We believe that this relatively good showing in years of severe general business depression contains a lesson for similarly situated companies in 1933. We found it possible to earn a profit even on reduced volume through the inauguration of the following policies:

1. The realization that we were not sufficiently large to distribute our goods nationally, and that, therefore, it was desirable for us to confine our sales campaign to a territory within a narrow radius of our factory, so that we could ship direct from mill door to dealer and thus eliminate the necessity of factory branches and warehouses. This plan of regional distribution has enabled us to cut our distribution costs by two-thirds.
2. The adoption of a one quality product to sell at a fair retail list price upon which we would allow the dealer a discount which would represent a fair margin of profit to him, but which was not sufficient to enable him to bargain and barter with his prospective buyer.
3. To build only one brand of merchandise, and to market only trade branded automobile tires.

Up to 1930, Norwalk tires were nationally advertised and distributed. We had 52 salesmen on the road, 25 warehouses and branch offices, and approximately 1,200 dealer accounts. We were constantly opening up new territories, some of which were profitable and some of which were not, and all of which required a considerable investment of missionary or development expense. This gave us a very high distribution cost.

It occurred to us that there might be sufficient business right here in New England for our company's relatively small output. Instead of 25 warehouses, one, our factory, might suffice, and that instead of 52 salesmen, all paid on a salary and commission basis, we might get along with a much smaller but efficient group working in New England and New York. As a matter of fact, our sales force was eventually reduced to six. It customarily had been the practice of our salesmen to contact dealers frequently. We planned to reduce this frequency of sales contact, and pass the savings along to the dealer in lower prices on tires. To this end we changed our field set-up, so that the salesmen would call but once every two or three months.

Many manufacturers were publishing price lists which were not adhered to and the absence of satisfactory prices was proving something more than a nuisance to dealers. Discounts off the list price and trade-in allowances had entered most transactions. Accordingly, transactions between customer and dealer had come to be more or less on a bargaining basis. We decided to attempt to overcome this unfavorable condition by establishing a one-price policy. That our action appealed to dealers was proved by the effort they put behind Norwalk tires and the substantial sales increases that resulted. One feature of our plan called for the restriction of business to dealers who we believed could give us a large volume and whose credit standing was on a high plane. Each was to agree to dispose of a predetermined monthly volume.

Certain features of our plan did not work out as well as expected. Among them was an adjustable price provision by which we were to bill on a basis of cost, plus overhead, plus 10 per cent profit. This feature was abandoned and certain others which proved to be unworkable in their original form were modified or revised.

Two years ago we were operating at about one-third capacity. Following the adoption of the policy of limiting sales to territories which could be served directly from the factory by truck delivery within twenty-four hours, our new business started to replace our losses in the national market. On the new basis, our customers numbered approximately 200 of the more prominent tire dealers in our natural territory and these firms were proving excellent volume outlets.

For the last two years, The Norwalk Tire and Rubber Company has been working close to capacity and making money. We have never regretted the fact that we have concentrated on our natural market. Not only have our external selling costs and distribution costs been reduced, but likewise restricted selling affected our internal administration. We save on bookkeeping, credit work and on inventory. Our credit losses this year have been less than 1 per cent, which is a very low figure for the tire business, and one man on a part-time basis takes care of passing upon credits.

In addition to changing our method of distribution, we have also put our financial house in order. We have reduced the par value of our preferred stock, have changed our common to no par, we have written off our goodwill, we have changed sinking fund requirements on the preferred, we have written off deferred charges and made drastic revaluation in our plant account, and we are now in a position again to make payments on our present preferred stock.

We also have adopted a cautious policy of diversification. This year we have introduced a one-price one-quality battery. The same type of dealer, the same salesmen and the same channels of distribution will handle this product. Up to the present time, we have had battery orders above our plant capacity. We may add to this diversification of product gradually, so that our distribution costs may be further reduced.

Canadian Rubber Industry in 1932

THOUGH it is now closing its fourth consecutive year of decreased volume, the Canadian rubber industry has again completed a strenuous 12-month period without a major casualty. Something of an achievement, it is significant evidence of the ability of this $80,000,000 industry which has upwards of 12,000 employees on its payrolls, to face realities.

Conditions in the industry for the year were carefully reviewed in a statement issued recently by F. A. Warren, general manager of Gutta Percha and Rubber, Limited, who is also president of the Canadian Rubber Association. Among factors contributing to this stability in storm, he notes that, in operations within the industry, its members have always faced ever-changing conditions and are thus comparatively well equipped to deal with shifting economic or production trends.

Mr. Warren's statement eschews all vague optimism unsupported by figures and goes directly to a major industrial problem which is peculiarly Canadian.

"The major problem facing a number of Canadian industries today," he says, "is the cost of distribution of goods, due to drastically curtailed volume superimposed upon the effect of the far-flung character of this country, and the limited population. The rubber industry is facing the challenge and there is noticeable a distinct tendency to remedy this situation. Without adequate volume per unit, the trade cannot flourish any more than the manufacturer."

The range of products produced in Canada is now very extensive, though the industry is chiefly associated in the public mind with the manufacture of automobile tires, and Mr. Warren comments that literally thousands of other items are included in its output.

The major divisions of the industry in Canada are summarized one by one. Important because, serving agriculture, mining, manufacturing and the railways, it is conceded to be a good barometer of general business conditions, the mechanical goods section comprises such articles as belting and hose. Here, Mr. Warren states, no really change in trend has developed to date.

In tires, conditions have not improved due to stagnation in the automotive industry. One of the more recent advances in this line is experimentation on the so-called "Doughnut," or low air pressure tire. Definite progress is being made but the industry as a whole seems to favor further development work and to feel that specifications will have to become more standardized before satisfactory results will be attained.

"Rubber footwear has had a difficult year," Mr. Warren comments frankly. "While domestic business has been fairly well maintained, exports have been sharply curtailed due to Asiatic and Continental competition. The inevitable result is greater production cost on this reduced volume.

"Cold weather this season, favorable to the footwear industry, created the situation of a demand which the trade was unable to fill due to insufficient stocks on their shelves. It is hoped that footwear shipments will continue to move and reduce manufacturers' inventories sufficiently to warrant the continuation of present employment.

"It is too early yet to predict the precise result to the rubber industry of the Imperial Economic Conference at Ottawa. Generally speaking, it is expected to prove beneficial in due course, but it is a fact that foreign exchange problems and fierce Asiatic and Continental competition make a continuance of export business increasingly difficult. At the same time, it must be admitted that the sagging tendency of the Canadian dollar is a source of concern since both rubber and cotton, the chief commodities used in the industry, must be imported."

Mr. Warren's analysis of 1932 sales suggests that a process of thorough deflation is in course of completion in Canada's rubber industry and this, as the beginning of his review states, without a major disturbance to the structure of the industry in this country.

"While final figures are not yet available, indications are that the sales volume for 1932 will have shrunk to well below 50 per cent. of the industry's sales peak," he states, "and will have returned to the pre-war level. It is fair to assume from the statistics currently available in the industry that employment totals have not shrunk to the same degree that sales have decreased—one of the more satisfactory aspects of the situation.

"The rubber industry has been a growing factor in Canadian life for over half a century. From a day of small things it has expanded its activities until today it is one of the great businesses of the country, exporting its products to many parts of the globe. In times likes these it is difficult to predict the future, but if we adjust ourselves to conditions as we find them, instead of waiting for a return of what is past, one cannot help viewing the long-range outlook of the industry with confidence."

Rubber Models Used for Securing Quantitative Stress Analysis

ALTHOUGH rubber has been used for years in reduced scale models of machine parts, structures, joints, etc., for obtaining qualitative analysis of stress distribution, it was not until recently that rubber has been employed to obtain quantitative results of sufficient accuracy, states Robert E. Kinkead in the January, 1933, issue of *Machine Design*. He attributes this new use to the improvement of the quality and method of manufacture of the rubber used for this purpose and a decidedly improved technique.

In brief the method of using rubber for test purposes is as follows: A reduced scale model of the piece to be tested is cut out of special rubber now available for this purpose. Numbers are placed on the cross-section surface of the rubber for convenience in making measurements. A stress-strain diagram of the particular piece of rubber from which the scale model was made is then measured and plotted. Then by trial and error the locality of maximum stress is established by applying loads and any necessary changes in design made. For practical purposes steel worked below the yield point is considered as a material of infinite stiffness so far as stress distribution is concerned. At light loads the curve for rubber coincides with the curve for steel. The softness of rubber (Young's modulus 600) is the important advantage in connection with its use for this purpose. Deformations may be obtained which are directly measurable with a magnifying glass. Prolongation of the curve obtained in this manner permits an accurate determination of the amount of stress concentration in a steel model.

Technical Briefs

New Patent Claims Improved Properties Obtained By Mixing Accelerators

THERE has recently been granted to Winfield Scott, and assigned to The Rubber Service Laboratories Company, Akron, Ohio, a patent* relating to the curing of rubber employing a mixture of accelerators in the vulcanization step, for which is claimed a product of greatly improved physical properties.

The mixture of accelerators preferably comprise an accelerator of weakly acid nature with an accelerator of basic nature, each of which is relatively slow acting in the early stages of the cure but which mixture or a reaction product thereof, produced during the cure is particularly active. By these means, a powerful accelerator is capable of employment in a rubber mix in such a manner that no difficulties are encountered in processing the rubber stocks in the factory due to the desirable delayed accelerating action possessed by the mixture. It has been found that mixtures comprising an aryl thiazole disulfid with a basic accelerating agent exert a far more powerful action in the vulcanization of rubber than do any of the components of the mixture and likewise exhibit desirable delayed action characteristics.

Mercapto-benzo-thiazole disulfid is an example of a thiazole disulfid which is a mild accelerator of the vulcanizing process particularly during the early stages of the cure. Diphenyl-guanidine is an eccelerator of basic nature which is also relatively slow in exerting accelerating action in the cure. It has now been found that mixtures of these two accelerators, as well as mixtures of other basic compounds with thiazole disulfids, accelerate the vulcanizing step much more vigorously in the early stages of the cure and produce a vulcanized product at full cure that possesses much more desirable physical and commercial characteristics than do any of the components of the mixture when employed separately in a rubber mix.

*U. S. Patent 1,893,846, January 10, 1933.

Cumar*—In Rubber Compounding

CUMAR, a product of the Barrett Company, New York, is a softener, a tack producer, bloom retarder, and a mild anti-oxidant. In appearance it ranges from a hard brittle resin resembling ordinary rosin to a heavy viscous syrupy liquid. It has a very mild, pleasant odor. The color ranges from a deep reddish brown to a transparent pale yellow and is gauged by definite color standards. It is available in various types from 1.05 to 1.15 gravity. It is insoluble in water and does not hydrolyse. It is unaffected by dilute acids, alkalies and salts and is unsaponifiable.

Cumar mills readily into rubber, producing a smooth-flowing stock which tubes and calenders excellently. Cumar stocks do not harden upon standing. It imparts an enduring tackiness to uncured stocks and a characteristic gloss to the finished article. It has mild anti-oxidant properties, inhibiting the deterioration of rubber to a marked degree.

In rubber compounding Cumar may be used for two separate purposes. First, for breaking down rubber and as a tack-producing softener (generally requiring one of the lower melting types). In this case 2 to 10 per cent Cumar is sufficient. Second, as a combined softener and extender (requiring the highest melting point types of cumar), in which case 10 per cent to 100 per cent (on weight of rubber) may be used.

Cumar is used in the preparation of stocks which are designed for calendering and frictioning. Its tackiness is valuable in tire carcass stock, friction tape, adhesive tape, etc. It is also used in materials which are run on the tubing machine. The light color and low tinctorial power make it particularly applicable to colored inner tubes.

For articles where high resistance to electrical currents is desired Cumar is of great advantage due to its high dielectric strength. Cumar is also used in the preparation of cold pressed molded articles, with or without rubber and in hard rubber to produce materials of a high polish.

*Reg. U. S. Pat. Off. by The Barrett Company, New York, N. Y.

Emuwax

EMUWAX is the name of a new water-dispersible wax recently introduced by the Glyco Products Company, Inc., of Bush Terminal, Brooklyn, N. Y. It is arousing interest because of its great flexibility, light color and emulsifying properties. It is soluble to a greater extent than natural waxes in organic solvents. It disperses readily in hot water to give milky emulsions. It acts as an emulsifier for oils and waxes for polishes, creams, lotions, textile rubber softeners and lubricants. Emuwax melts at 115.8° F. and will not turn rancid.

Rubber Beaker Rings for Accelerating Evaporation on Steam Bath

THE rate of evaporation of a liquid from a beaker placed on top of a steam bath is notoriously slow, according to J. A. Scherrer, of the U. S. Bureau of Standards, Washington, D. C., in an article in the Analytical Edition, *Industrial & Engineering Chemistry*, Jan. 15, 1933. If, however, the beaker is supported so that from two-thirds to three-fourths of its length is immersed in the bath, the rate of evaporation can be increased threefold and made fully as rapid as from a porcelain evaporating dish. A convenient support is a rubber ring which fits the beaker snugly enough to hold it in the desired position, and yet slips on and off easily when wetted.

The size of the ring is determined by the size of the beaker and the difference between the outside diameter of the beaker and the next larger opening in the steam bath. The inside diameter of the ring should be 3 to 5mm. smaller than the outside diameter of the beaker in order to hold it firmly, and the sectional diameter must be large enough to seat the beaker snugly. The rings must be made from rubber compounded to withstand the action of heat and moisture, because ordinary grades of rubber deteriorate in a few days on the steam bath. A satisfactory formula, in parts by weight, is as follows:

Crude rubber	100
Zinc oxide	100
Phenyl-β-naphthylamine	1
Stearic acid	2
Tetramethylthiuram disulfide	3
Total	206

Rings of this composition made and vulcanized for 30 minutes at 125° C. showed no swelling, tackiness, or evidences of deterioration after 500 hours' use on a steam bath.

New Factory Equipment

New Spadone Horizontal Bias Cutter

A NEW bias cutter, incorporating many novel and unique features, has recently been developed by the Spadone Machine Company, 15 Park Row, New York City.

It is of the horizontal type, hydraulically driven, fully automatic, noiseless in operation, and entirely self-contained. It will cut from ½" to 40" widths on any angle with an ease and accuracy not heretofore obtainable.

Either production or direct fabrication methods of manufacture are practical with this Horizontal Bias Cutter as it is adaptable for both consecutive or selective cutting. Plies of the same width can be continuously cut, or they can be varied at will so each ply is of a different width. The speed is approximately 40 cuts per minute, or about the same as their Vertical Bias Cutter. Change of angle is readily accomplished and the whole machine is within the control of one operator.

The hydraulic drive, in addition to the accurate cutting feature, permits a marked simplicity in construction, greatly reducing the number of moving parts, assuring low maintenance.

New TAG Flow Controller

HAVING made installations on many representative type of rate-of-flow control, the C. J. Tagliabue Manufacturing Company, Brooklyn, N. Y., has announced the TAG magnetic clutch flow controller, the development of which was completed early in 1932. A complete line of orifice meters is also available in this construction.

The TAG magnetic clutch operates the pen as positively as a mechanical coupling would. This can be demonstrated by moving the pen by hand and submerging the float in the mercury. By the almost total elimination of friction regardless of the pressure being handled, greater accuracy has been achieved. When the float moves the rotor turns instantly. When the rotor turns, the Cobalt steel magnets turn exactly the same amount because the rotor and magnets are locked together by the invisible but powerful magnetic field. The rotor turns in a closed-end cylinder of non-magnetic stainless steel. The magnets outside this cylinder are mounted on ball bearings and transmit the movement to the pen. The magnets are completely shielded and are housed in a dust-proof case.

The low pressure leg can be interchanged by the user so that the differential range can be made either 20", 50", 100" or 250". A 100" range volumeter is also available which enabled use of a chart graduated uniformly in units of flow which is particularly desirable for rate-of-flow control work instead of the "progressive" chart.

Impact Tester

THE Schopper impact tester, marketed by Testing Machines, Inc., 314 Broadway, New York, conforms to the standard of the A.S.T.M. for testing plastics (bakelite, hard rubber, etc.).

There are two types of tests, both equally recognized in the A.S.T.M. standards. In the "Charpy" test the specimen is laid horizontally across two supports and in the "Izod" the test is gripped in a vertical position. In both tests the hammer, swinging on the end of a pendulum, falls from a fixed height and at its deepest position strikes the test specimen, breaks it and passes swinging to the other side. The hammer carries with it an indicator needle along a graduated quadrant. The quadrant is graduated to indicate the amount of energy absorbed by the test specimen. The range is 0 to 2 foot/pounds and each scale division is .01 foot/pound.

The Schopper standard impact tester is made for either the Charpy or the Izod system (but not both systems on the one tester).

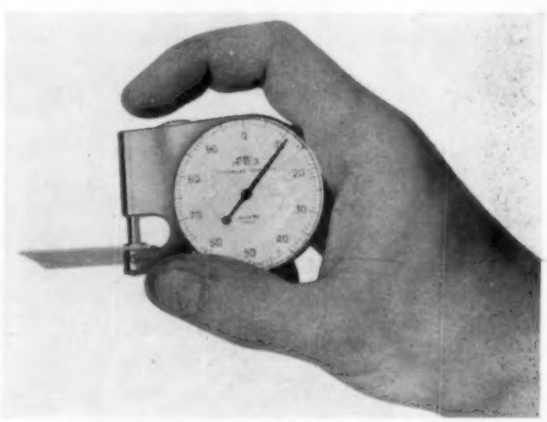
The specimen sizes are: For the "Charp" test ½ x ½ x 5". For the Izod test ½ x ½ x 2½". However the Izod test specimen are usually molded in 5" lengths so that two tests can be made on the one specimen, the bottom of the grip being open so that the specimen can be lowered deep enough so as to permit making the first test on such a specimen.

Where individual requirements necessitate it, the tester can be equipped for more than one testing range. This is accomplished by providing with the tester two or more interchangeable pendulum hammers for the desired energy storages. Each such hammer has its corresponding scale range on the quadrant of the tester.

Thickness Measuring Instrument

A NEW thickness measuring instrument has been recently developed by the B. C. Ames Company, Waltham, Mass., which is speedy and simply by hand operation, convenient to carry, durable, adjustable, and easy to read.

The spindle is raised to open anvils by turning the operating wheel at top. The anvils close with uniform spring tension when operating wheel is released, eliminating the element of personal touch, and giving the same dial readings for all users.



Ames Thickness Measuring Gauge

The dial is graduated in thousandths, and measurements in half-thousandths of the inch are plainly indicated. The number of graduations the pointer passes as the anvils are opened are counted and compared with the chart stamped on back of gauge, to determine the nearest fractional equivalent.

Being thin, light in weight and with no sharp corners or projecting parts, the Ames thickness measure is an ideal pocket gauge for salesmen, inspectors and mechanics, and far more satisfactory to carry continually in the vest pocket than any other type of measuring tool.

A. S. T. M. Activities in 1932

THE following summary of the 1932 activities of Committee D-11 on Rubber Products and D-13 on Textile Materials, of the American Society for Testing Materials, was recently published in the *Bulletin* of the Society.

"Committee D-11 has prepared new tentative specifications for insulated wire and cable: performance rubber compound, for friction tape for general use for electrical purposes and for rubber insulating tape. The new tentative methods of chemical analysis of rubber products have been adopted as standard.

Work is in process on test methods for wrapped and braided hose intended to replace the present detailed hose specifications which are little used. The proposed methods have been circulated for criticisms in advance of publication. In the study of life tests and correlation of accelerated aging with natural life, considerable data have been accumulated which are being closely studied. In the work on rubber products for absorption of vibration, a special instrument for the determination of compression set at elevated temperatures has been investigated by the subcommittee which is working on a standard method for conducting this type of test. This subcommittee is also undertaking the study of methods for testing fatigue under repeated compression in products used for the absorption of vibration. A new subcommittee is being organized for the standardization of methods of testing adhesion between rubber and metal with particular reference to the use of this combination in automotive products used for the absorption of vibration. The recently organized subcommittee on dynamic fatigue testing has formed two sections, one for investigation of test methods on flexing of rubber fabric combinations which results in ply separation and the other for the investigation of flex cracking of rubber.

"Committee D-13 is studying among other subjects, calibration methods for tire cord and horizontal testing machines; twist testers for single yarn; tire cords made from various types of cotton, the object being to set up standards of strength for the various types. Methods are being studied for the determination of shrinkage of light and medium weight cotton fabrics."

Longevity for Tires

THE Rubber Manufacturers' Association, representing practically 100 per cent of the tire manufacturers of the United States, is constantly engaged in disseminating and distributing educational literature to the motoring public on the proper care of tires. It is their purpose in such educational efforts to secure for the motorist all the mileage possible out of the individual tires, thereby reducing unwarranted claims for adjustments under the standard tire warranty, subscribed to by all tire manufacturers.

The following has been published by the Association covering "Tips on the Care of Passenger Car Tires:"

"Tires should be inspected once a week, particularly during the summer, to see that the air pressure is up to the recommended standard.

"Make it a habit to test your tires every Friday so that they will be in perfect shape for the week-end, when they do their hardest work. If you will form this Friday habit, you will add many thousands of miles to the life of your tires and you will enjoy greater riding comfort.

"There is a correct pressure for every size of tire and type of car. It is the pressure at which both tire and car give most efficient service. Improper inflation is any variation from this corrected pressure, whether under or over.

"Under-inflation is the direct cause of approximately 80 per cent of all premature tire failures. An under-inflated tire flexes excessively, which increases the tire heat and heat is the worst enemy of rubber. Two sets of tires, one run at recommended pressure and one six pounds under-inflated, have shown a difference in mileage as much as 25 per cent.

"Over-inflation rounds out the tire too much thereby reducing the tread width in contact with road. This results in fast tread wear.

"Over-inflation also causes the car to ride uncomfortably. The luxurious riding quality of the finest car is noticeably impaired when the tires are too hard. In addition both body and mechanism are severely jolted and strained. Squeaks develop, fine adjustments are lost and finally repairs are required.

"Therefore, since incorrect pressure reduces mileage and riding comfort, it is a good habit to test your tires once a week and thereby maintain the proper pressure which contributes to greater all-round efficiency.

"Mis-alignment of front and rear wheels, due to bumping curbs, collisions or improper adjustment of the car mechanism, frequently is the cause of premature and uneven tread wear.

"Periodic inspection of your car for correct wheel and brake adjustments pays big returns in lower tire costs and greater tire satisfaction."

Gutta Percha Substitutes

THE steady increase in the price of gutta percha, which has been brought about by the gradually decreasing supplies of the commodity, has stimulated the production of substitutes. During the past few years all kinds of ideas have been tested, improvements in the inferior brands of ordinary gutta to make them saleable, dilution of good gutta with rubber, resins, waxes, bitumens, and the like with no rubber or gutta content; and latterly the use of deproteinized rubber softened with waxes. Certain of these compositions have obtained a respectable market, but none has proved to be entirely satisfactory.

E. S. Ali-Cohen claims invention of one of these substitutes, with his new "Alco gutta." Hitherto gutta percha substitutes of the varieties outlined above have involved complex manufacuring processes and at best are but mixtures of solids apt to suffer from lack of homogeneity. On the other hand, "Alco gutta" is made by adding an emulsion of one or more resins and waxes in alkaline soap solution to latex with any suitable fillers desired. The mixture is then coagulated by means of an aluminum salt which forms an aluminum soap. This product can be made entirely homogeneous, transparent and uniform.

It has many notable properties, and can be rolled into thin sheets of good heat plasticity, hardening rapidly. Its dieelectric constant is the lowest known in cable practice and the addition of pure gutta percha does not improve this property. By suitable choice of fillers a wide range of qualities (in regard to strength, electrical characteristics and price) can readily be obtained.

Apart from its obvious uses in electrical insulation compounds, adhesives and varnishes of all kinds, it has an interesting application in rendering crepe sales and heels non-slippery without loss of wearing qualities. It is anticipated that a large market awaits the new product.

Another product which the gutta percha shortage has recently brought into the limelight is karite, better known as "Shea butter," the nearest approach to gutta percha found in Africa. It is a solid fat found in the seeds of the Shea or Bambouk rubber tree, and the karite is separated from it during soap manufacture. Exhaustive investigations recently conducted by two German scientists prove that this product is a rubber hydrocarbon of the same type as gutta percha, balata and caoutchouc.

Editorial Comment

Ford on Technocracy

AS a pertinent comment on the present controversy on the subject of technocracy it is interesting to note Henry Ford's defence of the machine, given in a recent interview:

"It is nonsense to call the machine a Frankenstein monster which is crushing its creator. The machines are not driving men out of work. Quite the contrary. Our experience for thirty years is that every time we reduced the number of men on a given job, and thus lowered costs, we had to hire even more men on account of increased business. Besides, we view this thing too narrowly.

"Every efficient business creates many outside businesses. Look at the oil, rubber, garage, gasoline, road building and a hundred other lines of business that grew out of the automobile. Employment and income have constantly increased. What we need just now is as much improvement in our economic sense as we have made in our mechanical sense."

Unemployment Reserves

THE National Industrial Conference Board has recently announced the early publication of a report which will propose a program of unemployment reserves for American industry and also stress the importance of prompt concerted action by industrial leaders to guide and shape legislation on this subject.

"There are several cogent reasons why industry should act in this matter," says the Conference Board. "First, it is recognized that industry has a responsibility in relation to unemployment, which involves an obligation to assist its stable and permanent workers to protect themselves against the vicissitudes of employment in normal times. This responsibility should be met; industry should do its fair share toward the solution of the unemployment problem.

"Second, action by industry for the establishment of private unemployment reserve plans would help to reduce the dimensions of the problem of unemployment in general. It would at least effect a partial solution of the problem, by providing for considerable groups of the stable and permanent workers.

"Third, a program of unemployment reserves that was generally agreed upon by employers would set a standard or model that would influence the character of legislation on this subject. If, as recent developments clearly indicate, legislation of some kind is inevitable, industry should take measures for shapng the course of legislation, particularly for preserving to employers the right to establish and operate their own plans. The most effective way to combat objectionable proposals of legislation is to offer sound alternative proposals of a constructive character that will command the support of legislators and the public generally."

The Conference Board directs the attention of industry to the fact that the legislatures of 43 states will be in regular session during 1933 and that in most, if not all, of these state legislatures proposals for the establishment of state systems of unemployment insurance or reserves will be introduced and strongly supported.

The Rubber Market

VIEWING the year 1932 in retrospect it is interesting to read some of the comments of our British cousins, particularly as they touch the producing end of the industry. H. Morison and Company's review of the year is especially interesting, as coming from one of the leading trading houses in Mincing Lane. They say in their January, 1933, bulletin, as follows:

"So far as the rubber market is concerned the year which has just closed, while generally speaking uneventful, has not been without certain interesting features.

"Writing twelve months ago we said that 'natural factors are working towards an equilibrium all the time.' That this was true is shown first by the decline in production during the year, and second, by the continued falling off in costs of production. Unfortunately consumption has again fallen off during the period, and so the decline in production has not had its full effect. In addition, it has not proceeded so rapidly as had been expected. This slowness is mainly due to the still further fall in costs which have had the effect of minimizing estate losses and making it less costly to continue to produce unwanted rubber than to cease tapping altogether, with the consequent disturbance of estate labor, etc., and bearing in mind the difficulty of getting that labor back when conditions warrant, without considerable expense. This reduction in costs, however, carried to the length it has been, can hardly be justifiably looked upon as permanent.

"Undoubtedly the experience of the last few years has shown that the old time idea of cost of production was pitched enormously too high, but present day costs are admittedly too low, and on an improvement in price will certainly show an upward tendency. However, it may be said with safety that a price for rubber in the neighborhood of 6d. per pound would provide very handsome dividends for shareholders in the majority of companies.

"One of the outstanding features of the year has been the large amount of rubber taken by Russia, and this is commonly reported to have been largely used in the manufacture of footwear. Another feature of considerable importance is the increasing use of latex for many purposes, and it appears probable that this will develop to a much larger extent, necessitating, no doubt, certain rearrangements in estate practice."

CURRENT • NEWS
of the Rubber Industry
FEBRUARY, 1933

Tire Price War Looms As Result Of Mail Order House Reductions

Firestone Precipitates Price Slashes in Meeting Mail Order Reductions by 5 to 10 Per Cent Cut on Feb. 1st—Action Decried by Other Manufacturers

FOLLOWING on the heels of a price war truce which had apparently been localized around Cleveland, The Firestone Tire and Rubber Company, announced on February 1, that to meet an anticipated reduction in mail order prices, they would reduce all first and second line tires 5 to 10 per cent. The action immediately brought retaliation from the mail order houses through a further announced reduction of from 5 to 15 per cent, to bring their tire prices into severe competitive position, and in turn forced the leading tire manufacturers throughout the country to meet the new Firestone price scale.

The action of the Firestone company has been generally decried by the leading executives of the rubber companies who have for some time been exerting every influence to maintain tire prices at least at the previously phenomenally low levels. Mr. Firestone's statement in justification of his action, is quoted at the end of this article.

Firestone's reductions represent the latest step in a severe competitive struggle which has been waging within the tire industry since last September. They follow a wave of drastic price cutting through concessions from list prices which had served to invalidate the regular price schedules in most of the important markets in the country.

Intensive efforts have been exerted recently to check this price warfare which has resulted in below-cost business for a large part of replacement tire business, normally the most profitable for the industry.

Some interests in the industry are hopeful that the reduction of 5 to 10 per cent in the industry's list prices, as forecast by the Firestone move, coinciding with efforts to check price cutting below the list, will stabilize prices at the new established schedules. Such a circumstance, they declare, would actually increase the return to factories on tire sales by 10 to 30 per cent from the levels prevailing during the recent price shading struggle since the factories could thus restore their normal discount to dealers and eliminate the special discounts which were necessary to enable dealers to meet competition during recent months.

On the other hand, if the keen competitive struggle for retail business in the current restricted market should lead eventually to a duplication of the recent practices of bidding for the available business through constantly increasing discounts to buyers, the price structure of the industry would be adversely affected to the extent of the present cut.

The Firestone announcement issued in conjunction with the notice of its price reduction of 10 per cent on first line tires and 5 per cent on second and third line tires, again called attention to its traditional opposition to the tire selling activities of the mail order houses. The reduction of 5 per cent on second line tires, which are priced competitively with the highest priced mail order brands, was declared to be dictated by the fact that the tires sold by mail order are priced 5 per cent below the tires sold by the mail order houses in their branch stores. The belief in trade circles is that about 80 per cent of the mail orders' tire business is done in their stores.

Statements from the Industry

The statements by Goodyear and Goodrich officials expressing strong disapproval of the Firestone price cut emphasize growing divergence of opinion on trade policies among the principal factors in the industry. On the one hand, Firestone's avowed opposition to the manufacture of special brand tires for distribution through outside organizations, which appears to be the principal cause of the present adjustment, has the support of many of the smaller companies in the field. On the other hand, Goodyear, Goodrich and United States Rubber, which, with Firestone, are the largest manufacturers in the industry, defend their special brand business as valuable in absorbing their overhead load.

In June, 1932, when the industry had tentatively determined to raise prices to cover the federal excise tax effective on that date and to provide an additional price increment for the manufacturers, Firestone refused to follow the increases until the mail orders had similarly met the advance. The mail orders would not increase prices at that time, however, on the grounds that the abnormally heavy shipments of pre-tax tires to the manufacturers' dealers had placed dealers in a position to undersell mail order brands if the mail orders followed the increase. This development forced the other manufacturers to rescind their increases and it was not until September that all factors in the industry advanced their lists sufficiently to cover the tax.

Shortly thereafter, the keen competition for available business stimulated widespread concessions from list prices, starting first with increased discounts on large commercial accounts and later spreading to all brands of merchandise in leading centers. As price shading gathered momentum, it resulted in the offering of as many as six and seven 10 per cent discounts to buyers, with occasional instances of even sharper reductions.

Refutes Firestone's Position

Commenting on the Firestone tire price reduction, James D. Tew, president of B. F. Goodrich Rubber Company, said:

"While it will be necessary for Goodrich to change prices in order to keep its dealers competitive, no change will be made until we have had an opportunity to study the new list.

"In our opinion present economic conditions do not justify any reduction in tire price, and we cannot believe any benefit to employees, security holders or the general public will result."

Informed of the nature of the Firestone statement on prices, R. S. Wilson, vice-president of Goodyear Tire and Rubber Company, said:

"We had earnestly hoped to avoid further price reductions. We could detect no public demand for such reduction and could see no valid reason for making them.

"The premise of the Firestone statement is correct in that prices listed in recent mail order catalogs were 5 per cent below prices at which the same tires are sold in their stores. The volume of business affected by these catalog prices is less than 3 per cent of the total renewal market. Tires sold by direct mail do not carry with them the

usual mounting and other services given by retail and other outlets. That the remaining 97 per cent of the tire market should be disrupted under such reasoning is a matter with the tire industry."

John A. MacMillan, president of the Dayton Rubber Manufacturing Company, stated his company will reduce prices on its tires in line with the cuts made by Firestone Tire and Rubber Company.

Statement of Harvey S. Firestone, Sr.

(Issued February 7, 1933)

A Defense of His Position in the Recent Tire Price War—Declares That Vicious Price Cutting Is Gradually Driving Industry Into Insolvency

"PRICE-CUTTING business destructionists, many of whom are doomed to bankruptcy, would like to drag their competitors down with them to this fate," Mr. Firestone said.

"The rubber industry is one of the best major industries in this country today. During the first ten months of 1932, production in the industry was more than 50 per cent of capacity, using 1929 production as capacity. Our government recognized this when Congress, seeking to balance the budget last May, and, being short $50,000,000, turned to the rubber industry and placed a levy of 2½ cents a pound on rubber tires and 4 cents a pound on rubber tubes, amounting to a 10 to 15 per cent excise tax.

"The basic evil in the tire industry is the policy of some of the large tire manufacturers to furnish special brand tires to large distributors, such as mail-order houses, at discriminatory prices compared to the prices at which these same tire manufacturers sell to their own dealers. By 'special brand' tires, I mean tires that do not bear the name of the manufacturer, but instead bear a name designated by the 'special brand' distributor.

"The unfair competition, resulting from these discriminatory prices has put thousands of tire dealers out of business, which made it necessary for us to establish in many places our own retail outlets and in many other places to finance the dealer in order that he might continue his business. It has also been necessary for us to bring out three lines of Firestone tires, comparable in quality and construction to the lines of 'special brand' tires, and sell them through our dealers and stores at a competitive price.

Mail Order House Competition

"By a series of price-cuts made possible by their discriminatory buying prices the mail order houses have for the past five or six years kept the rubber industry in a very unsettled condition, which has been inimical to profit-making by either tire manufacturer or tire dealer.

"Smaller manufacturers who were unable to finance lines of tires to compete with these special brand tires have been forced to cut the price on their standard brand tire. This has contributed to bring about the most vicious price war in tire history. Tires have recently been sold to commercial buyers at discounts from list prices running to as many as eight successive 10 per cent discounts. In one case, a dealer purchased several makes of tires at these low prices and then advertised them for sale in the newspapers at 60 per cent discount off the regular list price. In another case, a manufacturer actually took competitive tires off a dealer's shelves, replaced these tires with his own tires, and then resold the competitive tires to this competitor's own dealers in other points as low as 55 per cent discount.

"Endeavoring to bring stability out of this chaos, we reduced, effective Feb. 1, our list prices 10 per cent on our first-grade tires and 5 per cent on our lines of tires competitive with mail order tires to meet the mail order houses' new catalogue prices. It was hoped that by so doing the industry could stabilize actual prices at these newly established schedules and through stabilization actually increase the net return to tire manufacturers and tire dealers.

Attempt to Stabilize Prices

"We had reason to believe that this list price adjustment would be accepted by the industry as one of the means of stabilizing the business, but in this we were mistaken, for manufacturers supplying special brand tires have been open in condemnation of this move as being a price-cut which economic conditions did not warrant and an injustice to employees and stockholders in the rubber industry. As I happen to be one of the largest stockholders in the rubber industry and almost every employe in the Firestone organization is a stockholder, no one could be more interested in a stable and prosperous rubber industry than ourselves.

"Our price revision immediately brought forth an announcement that the mail order houses had reduced their prices below their new catalogue prices which we had met and again destroyed legitimate efforts to bring a more stable condition in tire prices and merchandising. I am hopeful that the time will soon come when the tire industry will be freed from the evil of discriminatory prices, which are the root of all its major troubles."

Tariff is Raised on Rubber Footwear To Meet Japan and Czecho Competition

President Orders Assessment of Tariff on Basis of Sales Price Here Instead of Foreign Cost Value

CHANGES in the bases of duty on rubber soled and rubber footwear from foreign value to the American selling price was proclaimed on February 1 by President Hoover in acting upon recommendations of the Tariff Commission.

Footwear having fabric uppers and rubber soles will be assessed at 35 per cent of the American selling price and other footwear, wholly or in chief value of rubber, will be assessed at 25 per cent. Commissioner Thomas Walker Page, Democrat, dissented from the majority opinion of the commission which recommended the maximum increase permitted by law. The new duties will become effective March 3.

The investigation, which covered tennis oxfords, lace to toe shoes and sandals, all having fabric uppers and rubber soles, and rubbers, rubber gaiters and rubber boots, was instituted by the commission upon application of the Rubber Manufacturers' Association and in compliance with a request of the President, who enumerated various articles said to be suffering from import competition from countries with debased currencies, and asked that the adequacy of the duties upon them be investigated.

Further consideration of the subject at a later date was recommended by the commission in its report because of the comparatively short period it covered and the unusual conditions prevailing in the domestic and foreign industries, partly due to depreciated currency in Japan, "one of the two principal competing countries."

One Commissioner Dissents

Commissioner Page's dissent was based upon this phase of the findings. He pointed out that the period covered in the investigation is not only too brief to justify an increase of more than 50 per cent in the rate of duty, but is also marked by excessive abnormality in prices and probably in production costs. He charged that the commission recognized this when it recommended a further investigation. The opinion of the majority was based on a comparison of domestic costs, not with foreign costs, but with weighted average invoice prices of imports during only nine months of a single year, he added.

The increases, the commission said, were the maximum permitted by law and would become effective March 3. Under the flexible provision of the tariff act, no increase in excess of 50 per cent can be made by Presidential proclamation.

Statistics gathered by the Customs Bureau showed that in the first eight months of 1932 imports of rubber-soled shoes from Japan totaled 2,467,646 pairs, as compared with 1,074,096 pairs in 1930. The value of the imports jumped from $138,013 in 1931 to $250,485 in 1932.

American manufacturers protested, at hearings conducted by Commissioner Eble of the Customs Bureau, that Japanese rubber-soled footwear was selling in the United States at retail prices below the cost of raw materials to the American manufacturer.

Consolidation of Commodity Exchanges Approved—Will Begin Functioning in May

THE merger of four of New York's leading commodity exchanges into a single trading organization to be known as Commodities Exchange, Inc., has been assured, it was announced on February 9 when the Silk Exchange voted to join the consolidation. The other three exchanges had approved of the merger earlier in the week. The four exchanges involved in the merger are: Rubber Exchange of New York, Inc., National Raw Silk Exchange, Inc., National Metal Exchange, Inc., and New York Hide Exchange, Inc., whose combined volume of trading represents a value of more than $1,000,000,000 annually.

The exchanges have a combined membership of close to 1,000, in which leading countries all over the world are represented. Each of the four exchanges, however, will continue to function as a separate organization until the mechanical consolidation into a single operating unit under one roof and on one floor is completed. This can be accomplished, it is expected, in time to have the new exchange formally open in May.

"Because of the international character of the membership, and the basic importance of the commodities to be traded in, the merger has attracted world-wide attention," said Jerome Lewine, chairman of the joint committee which framed the merger plan. "Inquiries have been received, both from here and abroad, regarding membership in the new exchange from commission houses and individuals who are not members of any of the four exchanges involved in the merger, but who are eager to join an exchange which will offer such opportunities for diversified trading, as will Commodities Exchange, Inc."

The new exchange will have a paid-in capital of close to $1,000,000, representing payments made by each of the four exchanges of $900 for each outstanding membership. The balance of the assets of each exchange will be reduced to cash and distributed pro rata to its members at the time of the consolidation. The assets to be distributed to the members of the four exchanges, it is estimated, will amount in all to around half a million dollars.

Goodrich Service Awards

Besides Joseph S. Smith, 76, of 322 Cleveland street, Akron, Ohio, oldest employee in point of years on the active rolls of the B. F. Goodrich Company, eight other Goodrich employees have been awarded 20-year service pins in January.

They are: William B. Burns, chief clerk. tire division, Tallmadge; Robert Coleman, Route 2, Wadsworth, inspector, mechanical goods; Alfred Hawkins, 855 Damon street, elevator operator; Letella Modroo, 899 Dover avenue, stenographer, tire adjusting department; George Schanz, 1646 Manchester road, experimental department; Basil Fitzpatrick, manager, Goodrich Silvertown, Inc., Hartford, Conn., and Paul Moyer, mechanical goods sales correspondent, Philadelphia, Pa., branch.

Mr. Smith, who started in the drugstore business in Akron more than 54 years ago, was given his pin at the Goodrich management dinner at the Mayflower Hotel on January 20. He is in charge of the library and information desk of the engineering division.

DuPont Earns Dividend

E. I. duPont de Nemours and Company earned 45 cents a common share for the last quarter of 1932, which figure included dividends from General Motors investment equal to 23 cents a share, according to a preliminary statement of the company.

The earnings compared with total earnings of 36 cents a share in the preceding quarter, including 23 cents on the General Motors investment, and 92 cents a share, including dividends of 68 cents a share, in the final quarter of 1931.

Earnings for the year ended December 31 last, the report stated, were equal to $1.82 a share on 10,867,678 average shares outstanding during the period. The earnings included dividends from General Motors investment amounting to $1.15 a share on duPont common and compared with $4.29 a share on 11,008,512 average common shares in the year before. The latter earnings included dividends from General Motors investment amounting to $2.72 a share.

Goodrich Advertising Agencies

The Griswold-Eshleman Company, advertising agency with offices in Cleveland, Ohio, has been awarded the B. F. Goodrich Company mechanical goods division advertising, it is announced by J. H. Connors, Goodrich vice-president.

Ruthrauff and Ryan, Inc., advertising agency with principal offices in New York and Chicago, has recently been appointed to conduct advertising for the Goodrich tire and rubber sundries divisions, including Miller sundries.

McCann-Erickson, Inc., will continue to handle Goodrich footwear advertising.

March Meeting—Chicago Group

The next meeting of the Chicago Group, Rubber Division, A. C. S., will be held on Friday evening, March 10, at the College Inn, Hotel Sherman. A paper on "Cracking of Rubber When Exposed to Atmospheric Conditions" will be presented by J. Kirschner, Chief Chemist, Dryden Rubber Company, and a paper on "Rubber in Aviation" will be given by Thomas Wolf of United Air Lines. Reservations should be made with B. W. Lewis, Secretary, 365 East Illinois Street, Chicago.

Akron Group to Meet

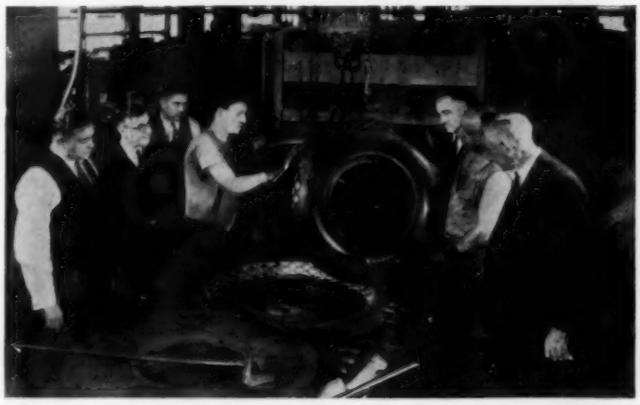
The winter meeting of the Akron Rubber Group will be held Monday evening, February 27th, at the Akron City Club. Dinner will be served at 6:30.

After election of officers, the following papers will be heard: "Tire Cord and Other Fabrics"—L. A. Graybill, Chief Technical Chemist, Bibb Mfg. Co., Macon, Ga. "Asbestos and Rubber Combinations"—S. Collier, Chief Chemist, Johns-Manville Co., Waukegan, Ill. "Naphtha vs. Gasoline Refining and Effects on Materials Produced"—B. C. Dodd, Anderson-Prichard Oil Corp., Eastern Division Manager.

Canadian Goodyear's 17,000,000th Tire

Production of the 17 millionth Goodyear tire at the New Toronto, Canada, plant was a highlight in the Canadian company's history, January 18.

Left to right are H. O. Allman, division foreman; E. H. Koken, general superintendent; J. E. Brack, foreman; C. S. Watson, advertising manager, and C. H. Carlisle, president and general manager, watching workmen remove tire No. 17,000,000 from the curing mold.



U. S. INCREASES USE OF NEWSPAPER ADVERTISING

Greater use of newspapers will feature the tire advertising campaign which the United States Rubber Company will sponsor in 1933.

The "tempered rubber" theme, which proved an effective factor in increasing consumer acceptance of United States tires in 1932, will be continued next year.

This campaign was credited with an important part in enabling the company to hold its own in dealer sales, improve its position in the original equipment field, and obtain a higher percentage in the total market—all in the face of depressed business conditions.

Newspaper space will be used more extensively next year as result of a factory paid national newspaper campaign which will be conducted. This will be in addition to two cooperative newspaper campaigns, similar to those used in 1932.

New Giant Rapatire

The National Rubber Machinery Company, Akron, O., has announced the introduction of a new type giant tire wrapping machine for all sizes of automobile tires within the range of 15" to 24" rim diameter, in cross sections up to 10½" and all 5" and 6" truck tires except the 36" x 6".

The smaller Rapatire is used principally by tire distributors and dealers, and the sale of this machine will be continued. The Giant Rapatire is desirable for the factory branch and for the dealer specializing in retreading truck and bus tires. It may be modified to meet the requirements of some tire manufacturers, and it is used satisfactorily for wrapping rolls of brake lining and wire.

The average size tire is wrapped in forty seconds; larger tires in approximately one minute. Kraft or crepe paper may be used, 2½" wide, standard 7" diameter rolls having 1¼" I.D. glued core.

The Giant Rapatire is driven by a ¾ H.P. geared motor. Prices vary slightly, depending on motor specifications. Request for quotation should state voltage, cycle and phase for alternating current, and voltage only for direct current.

Posthumous Suggestion Award

Mrs. Harry F. Gebhart, widow of an employee in the molded goods department of the Miller Rubber Products Co., Inc., division of the B. F. Goodrich Company, Akron, Ohio, has received a cash award for a suggestion made by her husband before his death.

Mr. Gebhart, employed in the miscellaneous molded goods department at Miller, made a suggestion concerning waste prevention before his death last September 26. He had been a Miller employee for many years.

Other suggestion awards at Miller just announced go to the following: Elmer H. Smith, mechanical maintenance department; Frank J. Roche, rubber doll department; John Soppit, mechanical maintenance department; Leonard Wellington, rubber doll department, and Jesse J. West, Anode division.

Goodyear Airship *Pilgrim* Installed Among Aeronautical Exhibits in Smithsonian Institute

THE Smithsonian Institution at Washington, D. C., has just installed among its thousands of exhibits the Goodyear airship *Pilgrim*, a craft whose technical and historical interest makes it worthy of association with many other notable aircraft displayed there.

The *Pilgrim* has the distinction of being the first airship designed for inflation with helium gas. Following the production of helium in quantity in 1921 the Navy's airship C-7 was inflated with this gas and performed satisfactorily, but the C-7 was the old type of airship. designed for hydrogen, with the car slung some distance under the bag so there could be no contact between the gas and the engine. The *Pilgrim*, however, being designed for helium, could have its car mounted snugly against the under side of the bag, thus improving propulsion and providing better streamline.

The *Pilgrim* was completed early in 1925. Its bag was 109 feet 6 inches long and 31 feet 6 inches in diameter. It was christened on July 18, 1925, by Mrs. P. W. Litchfield, wife of the president of the Goodyear Tire and Rubber Company. On its first trip Jack Yolton acted as pilot and Carl Wollam as co-pilot.

The *Pilgrim's* car has a seating capacity for a pilot and two passengers. Up to December 30, 1931, when it was retired from service, the *Pilgrim* had made 4,765 flights, carried 5,355 passengers, flown 2,880 hours, and covered 94,974 miles. It has flown more than any other non-rigid airship.

The Goodyear Tire and Rubber Company has been making airships since 1910, and during the World War that company made military balloons of all types.

The Goodyear Company now operates a fleet of small airships which have become familiar sights in nearly every state in the Union. The Goodyear company is the only company in the world operating a privately-owned fleet of ships of this type.

Lack of space in the Smithsonian Institution prevents the *Pilgrim* being shown in entirety, so the gondola or car forms the main part of the exhibit, with a portion of the gas bag attached. As now placed, the Goodyear ship is flanked by the *Chicago*, flagplane of the first world flight, and the *Bremen*, first airplane to make a non-stop westward flight across the North Atlantic. Near it are famous pioneer craft such as those of the Wright brothers, Langley and Curtiss, and notable planes of the modern era, including Lindbergh's immortal *Spirit of St. Louis*.

Airship Pilgrim

One of the Earliest of the Goodyear Dirigibles

Goodrich Retains Employes

The operation of the winter "share-the-work" plan in the Akron factories of the B. F. Goodrich Company since October 1 has resulted in the retention or the recall of approximately 500 workers, according to T. G. Graham, vice-president.

"Since Goodrich began its general program of spreading work throughout the entire organization, it is estimated that on present weekly schedules, a total of 4,000 have been held in employment," Mr. Graham said.

Bus Tire Contract

The Connecticut Company, a subsidiary of the New York, New Haven and Hartford Railroad, has awarded the United States Rubber Company a tire contract covering 256 buses.

The buses travel approximately ten million miles a year through New Haven. Meriden, Middletown, Hartford, Stamford, Bridgeport, Norwalk, Waterbury, New Britain, and New London.

U. S. Royal tires were specified and the new equipment went into operation on January 1.

1933 Safety Congress

The twenty-second Annual Safety Congress will be held in Chicago. The dates have been set for October 2nd to 6th, and the headquarters will be in the Stevens Hotel. Many new ideas are going to be worked into the meeting and visitors will be given plenty of opportunity to see the other "big show," the Century of Progress Exposition.

Norwalk Dividend

Norwalk Tire and Rubber Company has declared the regular quarterly dividend of 87½ cents on the $50 par preferred stock, payable April 1 to stock of record March 22.

General Tire Co. Ranks High Among Few Profitable Industrials

The *New York Sun* has just compiled a comparison of the earnings of 41 leading American industrial concerns for the fiscal years, 1931 and 1932.

The survey shows that 11 of these 41 companies made a better showing in 1932 than they made in 1931. For the other 30 companies, 1931 was a better year than was 1932.

Four of the 11 companies which made better showings in 1932 than in 1931 suffered deficits both years, but their 1932 deficits were less than those of the previous year.

Only three of these 11 companies made a profit both years and made a larger profit in 1932 than they made in 1931.

The most striking improvement in business in 1932 was made by the other four of these 11 companies, for each of them had had a deficit in 1931 but turned it into a profit in 1932.

Of these four companies, the *New York Sun's* figures show that the largest net profit was that made by the General Tire and Rubber Company, which recently reported a net income for 1932, after all charges, of $202,353. The 1932 net profits of the other three companies which had suffered deficits in 1931 ranged from $37,372 to $150,032.

Of the 30 companies whose showings were worse in 1932 than in 1931, six showed a profit in 1931 but a deficit in 1932; nine showed a deficit in 1932 greater than their 1931 deficit; and 15 showed profits but less in 1932 than in 1931.

The decline in the net income of all of these 41 industrial concerns in 1932 as compared with 1931, was 18.2 per cent.

New Filler Tank Hose

After a long period of research and experiments, perfection of a new type hose for tank wagon, tank car and bulk plant service, is announced by the B. F. Goodrich Rubber Company, Akron, Ohio.

Known as "wire filler tank hose," it is available in the 1½ inch, 2 inch, 2½ inch and 3 inch sizes with the same outside diameters as the older type construction, which makes it interchangeable through use of standard type couplings.

Similar to regular metal lined jacketed construction except that in the jacket a special wire is used as filler member alternating with the regular cotton filler strands, service tests on this new hose have shown a life of five times that of ordinary cotton jacketed gasoline hose, according to claims of the manufacturers.

Tank Hose Gets Severe Usage

Tank wagon and tank car service is unquestionably the most severe usage gasoline hose is called upon to meet because of rough handling, abrasion, and exposure to weather. With ordinary cotton jacketed hose, the jacket soon becomes loose, because of shrinkage and expansion of the jackets due to variations in atmospheric conditions and absorption of gasoline by the rubber liner.

Wire filler in the jacket of the new hose will not permit expansion of the jacket and assures a constant uniform compression of the rubber between the jacket and metal lining, adding greatly to life of the hose.

From the abrasion standpoint it has been found that when the warp strands of cotton are worn down to the wire, the wear is then retarded by the greater resistance of the wire, which also holds the hose firmly together instead of permitting it to break down as it is liable to do in all cotton jackets.

It might be supposed that this wire filler would make this hose stiff, but it is actually more flexible than regular cotton jacketed construction, according to the statements of the manufacturers.

Fabric Plant for Sale

The Goodyear Tire and Rubber Company, owner of the Goodyear Mills, Inc., Danielson, Conn., is reported as seeking to sell its entire property in Danielson as a unit. The Goodyear Mills, used to produce cotton tire fabric for 20 years, have been closed and practically all machinery shipped to other plants of the company. In addition to the mill buildings, the company owns 108 houses, containing 400 tenements, as well as a 50-room hotel and the Williamsville Water Company.

Wire Plant Closes

The plant of the New York Insulated Wire Company, Wallingford, Conn., a subsidiary of the Essex Wire Corporation, Detroit, Mich., is being closed and manufacturing operations shifted to one of the corporation's Western factories, according to Ralph H. Mount, factory manager. The plant was reopened a few months ago after a long shutdown.

Kelly Increases Schedule

The Kelly-Springfield Tire Company, Cumberland, Md., which has been operating on a part-time basis for several months, has started to increase its production and employment schedules. Many employees are being recalled to working shifts of five days a week.

E. A. Saunders

E. A. Saunders, 83, former head of the Mishawaka Rubber and Woolen Manufacturing Company, who died January 27 in New York, was president of the company for 26 years before he retired in 1930.

He started in the rubber business at the age of 12 in Naugatuck, Conn. He contributed extensively to civic and philanthropic enterprises.

CANADIAN PLANT WINS SLUSSER SAFETY TROPHY

The Goodyear Tire and Rubber Company factory at Bowmanville, Canada, received the Slusser safety trophy for 1932.

Jack Kidney, head of Goodyear safety department, presented the trophy to A. M. Hardy, assistant superintendent of the Bowmanville plant, which set a record of no lost time accidents during the entire year. By operating through 1932 without a lost time accident, Bowmanville stretched its no lost time record to 22 months. The Gadsden factory is next, with 11 months without a lost time accident.

The trophy is given annually by Clifton Slusser, vice-president and factory manager of Goodyear.

INQUIRIES From Readers

The following requests have already been answered—but additional information is requested. Address replies to Editor, THE RUBBER AGE, 250 West 57th Street, New York City, mentioning inquiry number.

Rubber Lubricant

233A—Information wanted on source of supply for rubber lubricant applied to rubber bands used as motive power on toys, model airplanes, etc.

Waterproof Thread

233B—Raincoat manufacturer seeking thread which will not cause seams of lightweight raincoats to pucker when garment becomes wet.

Sponge Rubber Weatherstrip

233C—Rubber manufacturer wanted to make fabric covered sponge rubber weatherstrip.

"Sigal"

233D—Source of supply for a material called "Sigal" wanted. Is presumably a chemical used in compounding rubber or latex.

Inner Tubes

233E—Correspondent desires to know the constituents by weight of one pound of inner tubing.

Rubber Molds

233F—Information wanted on making of flexible rubber molds for producing plaster casts.

Latex Coated Fabrics

233G—Names of concerns wanted now finishing the following fabrics with latex surface: lightweight cotton jersey, cotton broadcloths, cotton airplane cloth and similar materials.

ONE OUT OF EVERY 3 TIRES ARE BADLY WORN

That one out of every three tires on the road is unsafe is indicated in a survey made by the United States Rubber Company at the toll entrance of the George Washington Bridge, spanning the Hudson between New Jersey and New York.

Investigators checked the condition of more than 25,000 tires on passenger cars crossing the bridge at all hours of the day. Only those tires which had been worn smooth were counted unsafe.

Of the 26,660 tires checked, 9,060 were absolutely smooth, or bald. This is 34 per cent of the total, or slightly more than one out of three. The remaining 17,540 possessed treads capable of providing varying degrees of traction.

Engineers have established that bald tires, which leave a smooth impression from edge to edge, have the dangerously low safety rating of 51 per cent.

An interesting feature of the survey was that every investigator counted exactly the same percenatge of unsafe tires, although their total count of cars and tires varied.

BATA WILL NOT MAKE RUBBERS IN BRITAIN

The Bata Shoe Company, which turns out 150,000 pairs of shoes daily at Zlin, Czechoslovakia, and many thousands more at its other European factories, began to erect its British factory at East Tilbury at the end of January. This expansion is being undertaken partly because of the British tariff and the depreciated exchange, which have made it difficult for Bata factories abroad to compete in the British market, and partly because of the Ottawa agreements conferring an advantage on firms exporting footwear from Britain to other Empire countries.

The 600-acre site for the British factory was bought a year ago by Thomas Bata. On his death the direction of the Bata concern passed to his brother, who is continuing the policy initiated by the founder. The British undertaking will be organized on lines similar to the factory at Zlin. Only two factories will be erected for the present. The shell of the first will be completed in 10 weeks' time, and it is hoped that it will be ready to begin manufacture in May.

As the firm sees no possibility of making rubber footwear in Britain at prices that can compete with those of the imported Japanese product, this branch of the trade will not be touched at Tilbury. But the firm is now building a factory for rubber footwear in India and, if possible, will import them into Britain under the preferential tariff.

New Tire Uses

When one starts out to buy a tire, it is assumed he is going to buy a tire for his automobile. However, this may be far from the case.

For example, the purchaser may have in mind a pneumatic tire for his lawn mower. Or it may be he wants a pneumatic for the baby carriage. Or it is possible that he intends to equip his wheelbarrow with a cushion of air.

The lawn mower tire, as made by the United States Rubber Company, is a smooth, black tread single tube tire, size 24 x 2½, and is used on power mowers, principally on golf courses. The baby carriage tire, the smallest make, is a 12.75 x 2.50 single tube, and is used extensively on de luxe carriages. The wheelbarrow equipment is less standardized but none the less effective. These new lines are being extended by the United States Rubber Company to make tires applicable to several other forms of vehicles and toys.

Nitrogen Gas in Tires

"Free air" for motorists will be a thing of the past at some future date, according to Dr. A. B. Cardwell, Tulane University, who reports that producers of gases are developing plans for the sale of nitrogen to the Standard Oil Company for distribution through its filing stations. Nitrogen has been found not to have the injurious effect of air on rubber inner tubes, he said, and plans are being advanced whereby it will be sold to motorists by the Standard Oil Company. Dr. Cardwell gave a lecture and demonstration of physical and chemical effects of liquid air.

M.E.M.A. 1933 Trade Show

Further progress in the development of plans for the 1933 Trade Show of the Motor and Equipment Manufacturers Association is indicated by the appointment of the 1933 M. E. M. A. Trade Show Committee by President George L. Brunner.

Mason T. Rogers, vice-president of the Multibestos Company, North Cambridge, Mass., has been named chairman of the committee. Other members are C. P. Brewster, K-D Manufacturing Company, Lancaster, Pa.; C. C. Secrist, Victor Manufacturing and Gasket Company, Chicago; G. W. Sherin, E. I. duPont DeNemours and Company, Wilmington, Del.; and F. G. Wacker, Automotive Maintenance Company, Chicago.

Although no definite decision has been made on the time and place for the 1933 Trade Show, Chicago is favored at the present time because of its central location and because of the many additional facilities and attractions available because of the Century of Progress Exposition. Members of the committee already have inspected several conveniently located buildings with exhibition facilities.

In discussing the 1933 M. E. M. A. Trade Show, directors of the association at their January meeting indicated that the committee should plan an exhibit which would be representative of all lines produced in the automotive maintenance field so that manufacturers could contact the greatest number of their distributors and so that customers at the same time could contact the greatest number of their suppliers.

TIRES IN PAIRS ARE FEATURED IN PHARIS ADS

After manufacturing private brand tires for mail order and chain organizations exclusively for years, Pharis Tire and Rubber Company, Newark, O., has entered the national advertising lists with copy featuring tires carrying the Pharis name, and introducing a "two-for-one" theme new to the industry.

Initial consumer copy, a page in two colors in the Jan. 21 issue of *Saturday Evening Post*, followed a year of direct mail work lining up dealers for the company's branded line.

All promotion material for the company is based on the idea of selling tires in pairs, rather than singly. The management believes that almost all motorists find at least two tires wearing out at the same time, and predicts that all tires will eventually be sold in pairs.

Consumer copy for the new branded line is designed to serve a two-fold purpose, interesting both consumers and dealers, and interest in the new tire and the "two-for-one" idea may be gauged from the fact that the initial advertisement drew 3,000 inquiries in three days.

United States Advertising Corporation, Toledo, is in charge of the advertising.

Rubber Waistband

An entirely new development in flannel trousers for tennis and other sports wear is the self-supporting waistband, which eliminates the need of either belt or suspenders. The "Selfixo" waistband, which has been introduced by S. Deyong, London, reaches across the back of the trousers from hip to hip.

It completely eliminates the use of buttons, belts, straps, or suspenders, looks very smart in wear and grips the body sufficiently firmly, but gently, across the back to prevent the shirt riding up, no matter how violent the exercise taken by the wearer.

The waistband is made of elastic chemically treated to withstand heat, perspiration, and also the use of soap and acids in washing and dry-cleaning processes.

Rubber on New Pontiac

Action of the permanently-lubricated, hydraulically-controlled springs in the new Pontiac straight eight is supplemented at 37 points in the chassis by the cushioning and silencing effect of rubber insulation.

The motor is cushion-mounted on five thick pads of permanent rubber compound. Rubber insulates the rear axle from the springs, the springs from the frame and the frame from the body. The front fenders, mounted as a unit on a single supporting member, are attached through rubber to the front cross member of the frame.

Cone shaped hollow pneumatic rubber stops on the axle serve as auxiliary springs by absorbing the shock of the frame on the axle which might result were the wheels violently to encounter a large bump or a deep depression.

PERSONNEL CHANGES ARE ANNOUNCED IN GOODRICH

Major changes were recently announced in the tire sales of the B. F. Goodrich Company.

W. C. Behoteguy, merchandising manager, is named manager of the automobile tire department, responsible for sales of Goodrich car tires and aeronautic sales.

W. C. Bray continues as manager of Goodrich truck, bus, solid and industrial tires and air containers. W. G. Kearney is assistant manager in charge of national, railroad, taxicab, state, county, municipal, reciprocal and mileage accounts.

J. A. Hoban becomes manager of the retail department in charge of activities of Goodrich Silvertown, Inc., retail division of the company, and other subsidiary retail operations.

Sales control is under direction of H. J. Lintner, assisted by E. A. Seeley in charge of personnel.

C. V. Barrington

Charles Valentine Barrington, 71, vice-president in charge of manufacturing operations for Jenkins Brothers, Bridgeport, Conn., died January 30 of a heart affliction aggravated by influenza.

Mr. Barrington joined Jenkins Brothers in 1920 after many years of activity in the Crane and Westinghouse enterprises. He was internationally known as an industrial executive, having represented the Crane interests in Russia and other foreign countries.

Jenkins Brothers has announced the appointment of Bernard J. Lee, Jr., as Mr. Barrington's successor. Mr. Lee joined the Crane Valve Company 26 years ago and was business manager when the plant was taken over by Jenkins Brothers. Under the new management he served as assistant business manager during the past 13 years.

R. M. REEL, chief chemist, Pharis Tire and Rubber Company, Newark, O., and W. R. MARSDEN, fabric technologist, Kelly-Springfield Tire Company, Cumberland, Md., have been elected members of the American Society for Testing Materials.

Rubber Stock Quotations

	Last Price 1933		—1933—	
	Feb. 6	Jan. 17	High	Low
Aetna	⅞	1	1	⅞
American Hard Rubber	—	—	—	—
Faultless	17½	17½	20	17½
Firestone	—	13¼	—	—
do. 6% pfd.	—	63	—	—
Fisk	—	—	—	—
do. 1st pfd.	—	—	—	—
General	25	27	25	25
do. pfd.	33	30	33	30
Goodrich	4	4⅞	6⅛	4
do. pfd.	10	—	18¼	10
Goodyear	12	15	18⅜	12
do. 1st pfd.	28¾	40¼	45	28
India	—	20	—	—
Kelly-Springfield	1½	1⅝	2½	1¼
8% certfs. pfd.	—	—	—	—
Lee	5	6	—	—
Mohawk	1½	1⅞	1½	1½
do. pfd.	—	20	20	20
Norwalk	—	—	—	—
Pirelli	—	—	—	—
Raybestos-Manhattan	6½	6⅛	7½	5¾
Seiberling	1⅞	—	2¼	1⅞
do. pfd.	—	14¾	—	—
Thermoid	1⅜	—	—	—
U. S. Rubber	4	4½	5⅝	3¾
do. pfd.	7¾	9⅝	12	7⅛

Names in the News

A. G. CAMERON, vice-president and general manager of Goodyear Tire and Rubber Export Company, recently completed 20 years service with his organization and was awarded the 20-year gold Goodyear service pin. Mr. Cameron has been in charge of the export company since its organization in 1923. He joined Goodyear in St. Louis in 1913 and was later in charge of the St. Louis and Dallas branches.

JOHN LOGE, employment manager of the General Tire and Rubber Company, was recently elected president of the Generator Club, an organization of the company. At the meeting William O'Neil, president of General, and C. J. Jahant, vice-president, made brief addresses.

G. L. W. WEBSTER has been named credit manager of the Goodyear Tire and Rubber Company to succeed the late H. B. HAMLEN, who died January 5. Mr. Webster has been associated with the credit department of Goodyear since 1917. He became credit manager for Goodyear in New York district in 1918. Four years ago he was brought to Akron as staff man for the treasury department. After a six months' visit in Europe and Near East in 1930, inspecting and establishing credit systems, he became credit manager of the export department and later was placed in charge of the eastern division.

A. L. FREEDLANDER, vice-president of the Dayton Rubber Manufacturing Company, Dayton, O., recently returned from a three months' trip to Europe in the interests of the company. Mr. Freedlander had the unique experience of making practically the entire trip by air, flying from Miami, Fla., to Pernambuco, Brazil, by plane and from three to Germany on the *Graf Zeppelin*.

D. H. LITTLE, president of D. H. Little Company, New York City, is making a trip to the Pacific Coast to see his principals, the Pacific Vegetable Oil Company at San Francisco, and en route will stop off to see his other principals, Anderson-Prichard Oil Corp., Oklahoma City, Okla.; Louisiana Pine Products Company, Shreveport, La., and Messrs. Falk and Company, Pittsburgh and Chicago.

HARRY H. KELSEY has resigned as purchasing agent of the Russell Manufacturing Company, Middletown, Conn., webbing and brake-lining, after 30 years of service with the concern. He is succeeded as buyer by G. TRYON PALMER, a member of the general sales department for several years.

J. H. CONNORS, vice-president and general manager of the B. F. Goodrich Company mechanical goods division, has been re-elected by acclamation to serve a second term as chairman of the Mechanical Goods Division of the Rubber Manufacturers' Association. Mr. Connors has been identified with Goodrich mechanical goods activities for more than 20 years.

S. W. CAYWOOD, vice-president and general manager of the International B. F. Goodrich Company, now on an extensive tour of the Orient, left India for Singapore on January 20, and after a few days' stay there will go to Shanghai and Manila. He plans to leave Manila about March 1 for Christchurch, New Zealand, where he will arrive about March 15. After a stay of about two weeks in New Zealand, his itinerary calls for a stop at Honolulu and then on to San Francisco and Akron, where he is due to arrive about April 26.

HARRY T. DUNN, former president of the Fisk Rubber Company, Chicopee, Mass., and its sales manager for about a year after the company entered receivership, has become a partner in the New York Stock Exchange firm of T. R. Timmins and Company, 61 Broadway, New York. He was one of the original incorporators of the Fisk company in 1898. The Fisk plant is still operating, but with a skeleton force, according to recent reports.

A. A. ROBB, sales engineer in the manufacturers sales department and O. J. SULLIVAN, manager of state, county and municipal truck and bus sales of the B. F. Goodrich Company, were in Detroit the week of January 16th, attending the annual national Road Show, Highway and Road Building Congress.

L. C. MOFFITT, manager of cutless bearing sales for the B. F. Goodrich Company, attended the National Motor Boat Show in Grand Central Palace, New York City, the week of January 20.

A. D. MOSS, director of purchases for the B. F. Goodrich Company, addressed the supervisory personnel of the company's processing division at their monthly meeting, Tuesday afternoon, January 24. "Salvaging Factory Waste" was his subject.

EDWARD P. CONNELL has recently been appointed vice-president of the Falk Corporation, Milwaukee, Wis. Mr. Connell has been with his organization since 1913. In 1924 he was named comptroller, in which office he has officiated since. In connection with his new appointment he will still continue his old duties.

Willard R. Carroll

Willard R. Carroll, 61, a consulting engineer of the Farrel-Birmingham Company of Ansonia, Conn., died in New Haven, February 3. He leaves a daughter, Mrs. Dorothy Kowalewski, with whom he resided. Mr. Carroll was born in Meriden. He attended the Sheffield Scientific School of Yale University and was later industrial engineer in rolling mills at Rome, N. Y., Waterbury, Pittsburgh and Shelton. During the war he was development engineer for the Derby Manufacturing Company and perfected several processes in the manufacture of machine parts.

Rubber Goods and Specialties

Rubber Dishes

Another new use for rubber that may cut down dinner and tableware replacements in homes, hotels and restaurants is announced by research engineers of the Goodyear Tire and Rubber Company in "Plioform," a rubber-base product from which dishes, kitchen appliances, and a wide range of molded goods can be manufactured at low cost.

Available in a large variety of colors, and types producing attractive mottled and opalescent effects, Plioform is entirely suitable for tableware, being tasteless and odorless and resistant to scratches. It is also "un-

breakable" in the same sense as most high grade plastics. Plioform also has qualities such as resistance to hot water and discoloration by sunlight or age which make it superior to well-known trade-name molding compounds for fabricating sundry novelties and gifts.

The new product is made of pure pale crepe rubber but unlike any molding types of hard rubber contains no sulphur and requires no vulcanization. In manufacture of the molding compound the rubber is dissolved in a solvent and a chemical action allowed to take place which results in the formation of a white granular product not unlike granulated sugar. This is the pure resin compound and when molded as such forms highly transparent articles of a light amber color. More often the pure resin is mixed with a filler and whatever pigment is desired and then milled which results in a thorough dispersion of pigment, filler, and resin compound in solid form. This solid sheet is then broken down into granulated form for molding.

In addition to the usual lines of kitchen aids, sundry novelties and laminated goods, the makers of Plioform compound have found excellent possibilities for it in the molded electrical parts field due to fine non-conductive qualities which make it especially suitable for parts such as radio tube bases.

Goodyear will not manufacture molded goods but will supply the Plioform resin, or compound, to manufacturers in the molded goods field.

"Fatigue-Proof" Tire

The new "Fatigue-proof" tire is Kelly-Springfield's 1933 offering to automobiles, claims for which are set forth in the statement that it is "fortified at every point against wear and weakness."

A. W. Barry, general sales manager for the Kelly-Springfield Company, states that his company has pioneered every step of the way in tire development and that the new 1933 product is a distinct achievement in scientific processing and manufacture.

"From the first rubber tire for carriages in 1894," says Mr. Barry, "to the first successful moulded tire, on to the first flat tread, the non-skid automobile tire with a 7,500-mile guarantee, the first caterpillar type solid truck tire, through to the modernized full balloon tire, Kelly-Springfield has lead in tire building. Now, our 'Fatigue-proof' tire is the latest development and it is constructed on the theory that tires get tired and that they must be made to resist that fatigue. Six new feaures to these tires are featured by the manufacturers. These are as follows:

"(1) Corkscrew cotton—A Kelly-Springfield discovery, far kinkier than ordinary cotton, which grips and holds and when woven into cord fabric is almost indestructible.

"(2) Gum-insulated plies—Greater adhesion is claimed than in ordinary tires. By a special process pure rubber compounds are forced under tons of pressure into the weave, increasing resistance to fatigue.

"(3) Prime first rubber—There are five grades of rubber.

"(4) Vitalized rubber treads—Bigger, deeper and thicker threads are made possible by new vulcanizing agents and a new secret process, giving 20 per cent more mileage than the best former records.

"(5) All Non-Skid—The new 'Fatigue-proof tires in comparison with other leading makes, after actual tests, are 95 per cent more non-skid than competitor A, 130 per cent over competitor B, 230 per cent over competitor C, and 300 per cent over competitor D. And, electric car tests show less noise than any tire ever made.

"(6) Made by monitor system and mountain tested—A new monitor system controls every particle of material, every process, insuring uniformity throughout.

Attractive Raincoats

A new line of attractive raincoats of rubberized crepe de chine, sudanette and other fabric constructions has been developed recently by Harris Brothers, raincoat manufacturers, 525 Seventh Avenue, New York City. Smart in style, light in weight and finished in a variety of color ensembles, with capes, umbrellas and hats to match, the new line is one of the last words in women's wear for the rainy day.

The coats are made of Fruit of the Loom cottons, water-proofed and backed with wafer-thin rubber lining. The styles include capes and coats with removable capelets, some reversible. Others are short cape effects with no sleeves, to wear over a suit or coat. In the ensembles is included in the handle of the umbrella, a pair of slip-on rubbers.

Packaging Drug Sundries

A practical and attractive idea in packaging hot water bottles has been recently developel by the Davol Rubber Company, Providence, R. I. Hot water bottles, fountain syringes and other rubber goods for the retail drug trade have for many years been packed in the most commonplace containers. All the thcughts of the various manufacturers seem to have been expended upon means of embellishing the product, as for instance by the introduction of color and by ornamental embossing. Little attention has been paid to the package in which the

merchandise must be displayed on the druggist's counter or in his window.

More than a year ago John A. Clemens, service manager of the Davol company, began to look for a new type of package which would meet three important requirements: visibility for the merchandise; accessability for close examination, and protection from shop-wear through exposure to dust or casual handling. The result of his study and experiment is the package in which Davol flat goods are now being displayed in drug stores throughout the country. The value of his accomplishment from the standpoint of package engineering is attested by the U. S. Patent Office which has allowed eight patent claims.

The package is made up of a single paper board blank which folds to make a complete box, opening at the side. A window of transparent cellulose is set into the blank so that in the closed position is constitutes practically the entire top of the box, and completely reveals the merchandise within.

The design is patented and controlled by the Davol Rubber Company, but realizing that it is eminently suitable for the display and packaging of many kinds of merchandise the company is planning to license its use in many fields.

Rubber News Around the World

CANADIAN TIRE CO.'S OFFER TIRE WARRANTY

As an additional step in a determined effort of the Canadian tire companies to further improve trading conditions in the automobile tire business and to avoid confusion as between tire dealers and motorists, the tire companies have put into effect a new passenger car tire guarantee, which clearly states the conditions of purchases in a manner that leaves no room for misunderstanding.

First and second line passenger car tires will be definitely guaranteed against any conditions that may render the tire unfit for further service for a period of twelve months. Third line tires will carry a similar guarantee for a nine months period. All breakdowns due to ordinary wear and tear or injuries caused by blowouts, cuts, bruises, rim-cuts, under-inflation, wheels out of alignment, faulty brakes, or any other road hazard except the ordinary puncture or ruin through running tires flat are fully covered.

This means that should a tire fail for any of the above reasons, the tire is either repaired free of charge or the user allowed one-twelfth or one-ninth of the current retail price for each month of the uncompleted period on the purchase of a new tire.

One of the many advantages is that adjustments will be available wherever that particular brand of tire is sold, giving the dealer handling the adjustment opportunities for profit. The new guarantee is definitely limited to passenger car casings used in private service.

A clear-cut tire guarantee of this kind is evidence of the confidence the tire companies have in the improved methods of tire construction and their intention to continue to give the tire user still better value.

FIRESTONE INVOLVED IN NEW LIBERIAN POLICY

The plan under which the League of Nations hopes to rehabilitate Liberia, negro republic in Africa, was announced at Washington recently.

The Firestone Tire and Rubber Company, which owns Firestone Plantations Company, and has extensive rubber production holdings in Liberia, is involved in the plan, and must accept it before Liberian loans will be continued, Washington dispatches reported.

Appointment of a chief foreign adviser by the League of Nations for Liberia and three foreign provincial commissioners are to be selected by Liberian officials. The league also will name a legal adviser and two medical officers. At Washington it was said T. L. Lyell of Cleveland, is now in Liberia investigating conditions for the Firestone Company.

At the same time vigorous protests have been made by the American Government to the Liberian Government regarding the latter's action in connection with a loan agreement with the Finance Corporation of America, a connection of the Firestone company.

"The Liberian actions," says a State Department statement, "include legislation on December 17, 1932, in contravention of the loan agreement, and subsequent acts by Liberian officials amounting in effect to confiscation of monies due to the American company and to the destruction of the security on which over $2,000,000 has been advanced by the company to Liberia."

Canadian Tire Exports

The export of pneumatic tire casings from Canada in December amounted to 30,169, valued at $239,532, as compared with 27,313 at $210,431 in December, 1931. These went to 57 countries, the chief purchasers being: British South Africa, 4,842; Brazil, 3,769; Straits Settlements, 3,308; New Zealand, 3,175; United States, 2,035; Spain, 1,370; China, 1,145; Dutch East Indies, 1,075; British East Africa, 1,045; British West Indies, 1,010; Colombia, 925; Peru, 808; Venezuela, 726.

D. E. I. Rubber Shipments, 1932

Crude rubber exports from the Dutch East Indies amounted to 20,670 tons during December, a quantity which compares with 20,014 tons during November, and with 23,940 tons in December, 1931.

Shipments were smaller for the total year of 1932, however, amounting to only 230,107 tons, compared with 284,199 tons during 1931. The Dutch rubber movement in 1932, followed a similar trend of the largest producer, British Malaya, which exported a quantity of 478,262 tons during the year, against 519,740 tons in 1931.

The Dutch East Indies figures for December showed that Java, Madoera, and the East Coast of Sumatra exported more rubber, while the rest of Sumatra and Borneo, shipped less than in November.

EQUIPS TRUCKS WITH MOVING RUBBER FLOORS

With a view to obtaining a more efficient substitute for the tipping motor truck used on its road services, the Great Western Railway of England has fitted a number of 2-ton and 6½-ton machines with movable rubber floors. The floors consist of a rubber band, extending over the entire width and length of the truck, and wound over a roller at each end. By the simple operation of winding from one end to the other, a load of sand or similar material can be discharged by hand in a few minutes.

SWETTENHAM TELLS HOW LUMUT MADE PROFIT

Presiding at the annual meeting of the Lumut Rubber Estates, Ltd., Sir Frank A. Swettenham, G.C.M.G., former High Commissioner for Malaya, said the company was one of the few able to make a satisfactory report. One of the reasons for this was that by dint of widespread economies the cost of production last year was further reduced by over ¾d. (1½ cents) per lb., and another was that the board had made some favorable forward contracts for 160 tons of rubber at better prices than could have been procured by waiting for what the market offered.

Having regard to the low estate costs for the current year, and considering that the enterprise had over £50,000 in cash and Government securities, largely the result of undistributed profits in past years, and the fact that rubber had been sold forward for delivery during the current year at prices ensuring a small profit, the directors have decided to declare a 2½ per cent dividend for the year, less income-tax.

Sir Frank explained that the policy of the Lumut board continued to be the production of the smallest economic crop at the lowest possible cost, while maintaining the property in good condition without resorting to expensive methods of cultivation or spending money on new and improved machinery.

Malayan Rubber Production, 1932

Production of crude rubber on large and small estates in British Malaya during 1932 aggregated 416,784 tons, as compared with a total of 436,456 tons produced during the year 1931.

Production was more than maintained on estates larger than 100 acres in size, chiefly European-owned, which accounted for an output of 240,116 tons, against 239,538 tons during 1931.

Estates less than 100 acres in size, mostly native operated, turned out a quantity of 76,668 tons, as compared with 196,918 tons during 1931.

The production trend was upward at the year-end, all estates reporting a total of 40,974 tons in December, against 34,031 tons in November, and 39,837 tons during December.

Bristol in England

The Bristol Company, Waterbury, Conn., recording instrument manufacturers, have established a British organization under the name of Bristol's Instrument Company, Ltd., with manufacturing facilities at 144 Pomeroy Street, New Cross, London, England. Howard H. Bristol, president of the Bristol Company, is chairman of the new company, and Alexander L. Dugon of J. W. & C. J. Phillips, Ltd., London, is vice-chairman and managing director.

REVIEW SHELF

• Monthly Review of New Books, Pamphlets, Company Catalogs, Service Bulletins, House Organs, etc., Pertinent to the Industry.

RUBBER LATEX. Published by Rubber Growers' Association, London. 158 pp. 1933. For free distribution. Second edition.

This is the second edition of this book, which was originally printed as a small pamphlet four years ago. Great strides have since been made in the application of latex and the present volume carries a comprehensive survey of the present technical uses of latex in manufacture of rubber goods, together with a list of patents and abstracts brought up to date.

In publishing the second revised edition, the title has been altered to "'Rubber Latex" as being more accurately descriptive than the original title "Latex."

The booklet deals with the properties, composition, coagulation, concentration, manipulation and compounding of latex and latex pastes, and its stabilization for industrial purposes. The vulcanization of latex and latex products, dipping and electro-deposition and the marketing and applications of latex are also discussed. A final chapter deals with a selected list of over 500 recent British patents and testifies to the growing importance which is attached to the direct application of latex. An index to the text and to the patents, together with a very full bibliography of books of reference and literature are included and should prove very useful.

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THE TALL TIMBERS. The New M. E. W. A. 14-Point Program. An address by B. W. Ruark, general manager, Motor and Equipment Wholesalers' Association. For free distribution. 26 pp. December, 1932.

The booklet contains the hitherto unpublished address delivered by B. W. Ruark, general manager of the M. E. W. A., at a special meeting held in Detroit during the automotive exposition last December.

Mr. Ruark's address was described at the time as "a two-fisted presentation of a very valuable program for the protection and promotion of jobber distribution."

Primarily an elaboration of the 14-Point Program of the M. E. W. A., the booklet contains worthwhile observations and recommendations on the subject of manufacturer-jobber relationships and shows how the operations of the M. E. W. A. improves those relationships, while at the same time preserving the complete independence of the Association in working for jobber distribution.

Relating past efforts to operate successfully a dual manufacturer-jobber association and clearly indicating his belief that those efforts were negligible as regards results in things that really count, Mr. Ruark maintains that the M. E. W. A. composed entirely of jobbers can do a better job for its members and the jobbing industry than an association made up of both manufacturers and jobbers.

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DESCRIPTIVE INFORMATION IN ANNUAL REPORTS TO STOCKHOLDERS. Published by the Policyholders' Service Bureau. Metropolitan Life Insurance Company, New York City. 58 pp. 1933. For free distribution.

As the third in a series of publications designed to present the practices of representative companies in connection with the data included in their annual reports, the Policyholders' Service Bureau of the Metropolitan Life Insurance Company has issued the above report. The previous publication dealt with financial statements in annual reports to stockholders, and the type of charts and exhibits found in these annual accountings.

The new publication, which completes the series, is concerned with pertinent information about a company's activities and operations which are inserted in the annual report because of their probable interest to stockholders. It classifies this descriptive material as follows: Information concerning nature of business, products, manufacturing and sales facilities; explanatory information concerning balance sheet and profit and loss items; new acquisitions, capital expenditures, and changes in and growth of corporate structure; review of operations, economic conditions, and industrial relations; statistical information to show trends. How these various items of information, all designed to give the stockholder a clearer picture of a company's position and outlook, appear in typical annual reports to stockholders, is described and illustrated.

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METHODS OF ORGANIZING AND CONDUCTING INDUSTRIAL SAFETY CONTESTS. Published by the Policyholders' Service Bureau. Metropolitan Life Insurance Company, New York City. 22 pp. 1933. For free distribution.

As a means of stimulating the interest of employees in plant safety activities and encouraging them to make concentrated efforts to prevent accidents, friendly competition in the form of accident prevention contests often has proved effective. The practices of a number of industrial organizations in connection with this phase of safety educational work are presented in the above report.

Safety competitions, according to the study, are considered of particular value in that they act as incentives to employees after the novelty of launching a safety program has dulled. The report analyzes the programs of representative industrial organizations with respect to organizing and conducting these contests. Particular attention is devoted to such subjects as planning the contest, methods of determining the standings between various units, types of trophies and awards provided and the methods followed in presenting them.

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THE ROMANCE AND DRAMA OF THE RUBBER INDUSTRY. By Harvey S. Firestone, Jr. 128 pp. 1933. For free distribution.

The book contains a compilation of fifty-one talks recently given on the "Voice of Firestone" radio program, by Mr. Harvey S. Firestone, Jr. One will find it helpful in any reference work concerning the history and facts of the rubber industry and full of the romance of the industry.

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DO YOU KNOW ABOUT? Glyco Products Company, Inc., Bush Terminal Building, Brooklyn, N. Y. 12 pp. 1932. For free distribution.

All the miscellaneous literature describing emulsifying agents, synthetic waxes, resins, etc., has been incorporated into the handy booklet. A number of new emulsion formulae and new products are included therein.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, FEBRUARY 6, 1933

Crude Rubber

SO little change has occurred in the crude rubber market in the last fortnight that the margin of fluctuation can be considered in 1/16th of a cent. Trading has been extremely dull, particularly on the Exchange and futures, even at the present attractive low prices, are not receiving interest. Some decline in shipments from the Far East and the steady drop in London and Liverpool stocks, which are presumably going to Continental consumers, has helped the statistical position slightly but not enough to affect the top-heavy condition on this side of the Atlantic. As reported last month, there are no new factors in the market which would warrant any change in price of a sudden nature, either way. Factories continue to restrict their production schedules and apparently have sufficient stocks on hand.

Prices on the New York outside market, for the more popular grades of crude rubber, as of February 6, were as follows:

Plantations—			
Ribbed Smoked Sheets—			
Spot	—	@	.03
Feb.-Mar.	—	@	.03
Apr.-June	—	@	.03⅛
First Latex, crepe spot	—	@	.03¾
Amber Crepe, No. 2	—	@	.02 9/16
Amber Crepe, No. 3	—	@	.02 7/16
Amber Crepe, No. 4	—	@	.02 5/16
Brown Crepe, Clean thin	—	@	.02 7/16
Brown Crepe, rolled	—	@	.02¼
Latex—			
Liquid Latex, per gal.	.70	@	.75
Paras—			
Up-river, fine	—	@	.06
Up-river, coarse	Nominal		
Acre Bolivian, fine	—	@	.06¼
Caucho Ball, Upper	—	@	.03
Centrals—			
Central scrap	.04	@	—
Esmeraldas	.04	@	—
Balata—			
Block, Ciudad	—	@	.16

LONDON MARKET

Standard Ribbed Smoked Sheets—Buyers			
Jan.	—	@	2⅛d
Mar.	—	@	2 5/32d

SINGAPORE MARKET

Standard Ribbed Smoked Sheets—Sellers			
Spot	—	@	1 27/32d

Reclaimed Rubber

No change has been reported in the price levels for the standard grades of reclaimed rubber during the last two weeks. The present prices represent already what manufacturers term rock bottom levels and any recession from these quoted figures is held unlikely. Production again fell off in December and consumption took a sharp drop. However, it might be remembered that crude rubber consumption that month was specially low and the rate of reclaimed used to crude was well maintained.

Current prices for the standard grades of reclaimed rubber are quoted as follows:

High Tensile				
High Tensile Red	lb.	.04¾	@	.05
Super-Reclaim Black	lb.	.05	@	.05¼
Shoe				
Washed	lb.	.05½	@	.05¾
Tube				
No. 1 (Floating)	lb.	—	@	.06½
No. 2 (Compounded)	lb.	.04½	@	.04¾
Tires				
Black	lb.	.03¾	@	.04
Black, selected tires	lb.	.04	@	.04¼
Dark Gray		.05	@	.05¼
Light Gray	lb.	.05½	@	.06
White	lb.	.05½	@	.05¾
Truck, Heavy Gravity	lb.	.05	@	.05¼
Truck, Light Gravity	lb.	.05¼	@	.05½
Miscellaneous				
Mechanical blends	lb.	.03	@	.03½

Scrap Rubber

There has been no changes in the quoted prices for standard grades of scrap during the past fortnight. With reclaimed production curtailed and the general situation stagnant, scrap is merely holding its own. Accumulations are difficult and prices are hardly profitable to the junk man to make collections. Late prices follow:

(Prices to Consumer)

Auto tire peelings	ton	16.00	@	18.00
Mixed auto	ton	6.50	@	7.50
Clean solid truck tires	ton	24.00	@	27.50
Boots and shoes	ton	15.00	@	17.50
Arctics, untrimmed	ton	10.00	@	12.50
Inner tubes, No. 1	lb.	.02	@	.02¼
Inner tubes, No. 2, compounded	lb.	.01¼	@	.01⅝
Inner Tubes, Red	lb.	.01⅝	@	.01½

Cotton

RAW cotton has fluctuated within such narrow limits during the last two weeks that it practically shows no change. The export demand shows a seasonal decline after shipment of January commitments. The increased trade from Japan has also dropped sharply. Cotton in consuming establishments on December 31 was reported at 1,520,110 bales as against 1,630,719 bales last year. Public storage cotton was also less. Unfilled mill orders for cotton cloth are reported to have increased during December by 12.9 per cent and sales were 9.9 per cent above production.

Yearly figures for 1932 show sales of cotton cloth at 104.8 per cent of production and stocks declined 26.1 per cent, which represents a new low record for some time. But considerable uncertainty prevails in the market in view of pending Congressional legislation and an utter lack of knowledge just what form any relief to cotton growers will take.

High, low and closing prices on the New York Cotton Exchange, as of February 6, were as follows:

	Jan. 27			Feb. 6
	High	Low	Close	Close
Feb.	—	—	—	—
Mar.	5.94	5.72	5.90	6.22
May	6.08	5.85	6.04	6.33

Tire Fabrics

(Prices Net at the Mill)

CORD				
Peeler, carded, 23/4/3	lb.	.22	@	.22½
Peeler, carded, 23/5/3	lb.	.21	@	.21¼
Peeler, carded, 13/3/3	lb.	.18	@	.18¼
Peeler, carded, 15/3/3	lb.	.19	@	.19¼
Egyptian, carded, 23/5/3	lb.	.34½	@	.35
Egyptian, combed, 23/5/3	lb.	.39½	@	.40
CHAFERS				
Carded, American, 8 oz.	lb.	.18	@	.18½
Carded, American, 10 oz.	lb.	.18	@	.18¼
Carded, American, 12 oz.	lb.	.18	@	.18½
Carded, American, 14 oz.	lb.	.17½	@	.18
LENO BREAKER				
Carded, American, 8¼ oz.	lb.	.18	@	.21
Carded, American, 10¼ oz.	lb.	.18	@	.21
SQUARE WOVEN				
Carded, American, 17¼ oz. 23-11 ply	lb.	.21	@	.21¼
Carded, American, 17¼ oz. 10-5 ply	lb.	.17	@	.17½

Sheetings

40 inch, 2.50 yard	yd.	—	@	.05
40 inch, 2.85 yard	yd.	.04⅝	@	.04¼
40 inch, 3.15 yard	yd.	.04¼	@	.04⅝
40 inch, 3.60 yard	yd.	.04¼	@	.04
40 inch, 3.75 yard	yd.	.03⅝	@	.03⅝
40 inch, 4.25 yard	yd.	.03¼	@	.03⅛

Ducks

Enameling	lb.	.18	@	.22
Belting and Hose	lb.	.19	@	.20
Single filling	lb.	.07½	@	.07¾
Double filling	lb.	.09½	@	.10

Closing Prices on Rubber Exchange of New York, Inc.

No 1 Standard Contract of 10 Tons*

FROM JANUARY 19 TO FEBRUARY 6, 1933

Date		Spot	Jan.	Feb.	Mar.	April	Sales
Jan.	19	2.93	2.86	2.91	2.97	3.00	23
	20	2.97	2.92	2.97	3.02	3.05	32
	21	2.96	2.87	2.92	2.97	3.00	48
	23	2.96	2.94	2.97	3.00	3.03	29
	24	3.06	3.04	3.07	3.10	3.13	55
	25	3.03	3.01	3.04	3.07	3.09	79
	26	3.00	2.94	2.94	3.05	3.07	29
	27	2.96	——	2.89	3.00	3.02	38
	28	2.96	——	2.85	2.99	3.01	17
	29	——	——	——	——	——	——
	30	2.90	——	2.83	2.93	2.95	54
	31	2.90	——	2.80	2.91	2.93	6
Feb.	1	2.90	——	2.78	2.89	2.92	39
	2	2.91	——	2.82	2.93	2.95	36
	3	2.92	——	2.84	2.94	2.97	28
	4	2.97	——	2.86	2.96	2.99	38
	6	2.97	——	2.88	2.98	3.00	14

*This contract will be superseded by "No. 1 B Standard" on April 1, 1933

Rubber CHEMICAL Markets

NEW YORK, February 8, 1933

ACCELERATORS

Organic

A-1	lb.	.24 @	.27
A-5-10	lb.	.33 @	.36
A-7	lb.	.55 @	.59
A-11	lb.	.42 @	.46
A-16	lb.	.57 @	.61
A-19	lb.	.58 @	.62
A-32	lb.	.30 @	.95
Aldehyde ammonia, crystals	lb.	.65 @	.67
Altax	lb.		
Captax	lb		
Cryiene	lb.	.55 @	.65
paste	lb.	.45 @	.55
Di-Ortho-Tolyguanidine	lb.	.42 @	.43
Diphenylguanidine	lb.	.33 @	.34
Ethylidene aniline	lb.	.45 @	.47½
Formaldehyde aniline	lb.	.37½@	.42
Heptene	lb.	.40 @	—
Hexamethylene-tetramine	lb.	.46 @	.47
Lithex	lb.	.18 @	.20
Methylenedianiline	lb.	.37½@	.40
Monex	lb.	8.25 @	—
Oxynone	lb.	.68 @	.80
Phenex	lb.	.50 @	.55
R & H 40	lb.	.40 @	.41
R & H 50	lb.	.40 @	.41
R-2	lb.	1.95 @	2.15
Safex	lb.	1.20 @	1.25
SPDX	lb.	.75 @	—
Super-Sulphur No. 1	lb.		
No. 2	lb.		
Thiocarbanilid, drums	lb.	.25 @	.27
Trimene	lb.	.75 @	—
base	lb.	1.20 @	—
Triphenylguanidine	lb.	.58 @	.60
Tuads	lb.		
Ureka	lb.	.75 @	1.00
Vulcanex	lb.		
Vulcone	lb.		
Vulcanol	lb.		
Z-88-P	lb.	.50 @	.60
Zimate	lb.		

Inorganic

Litharge, domestic	lb.	.05¾@	—
Magnesia, calcined,			
light	per 100 lb.	5.35 @	5.45
heavy	per 100 lb.	3.65 @	3.75

COLORS

Blacks (See Compounding Materials)

Blues

Prussian	lb.	.36 @	.37
Ultramarine	lb.	.06 @	.30

Browns

Sienna, Italian	lb.	.04 @	.08
Umber, Turkey	lb.	.04 @	.06

Greens

Chrome, light	lb.	.23 @	.26
medium	lb.	.26 @	.28
dark	lb.	.28 @	.33
Chromium Oxide, bbl.	lb.	.23 @	.27

Reds

Antimony

crimson, 15/7	lb.	.40 @	—
sulfur, free	lb.	.52 @	.56
Indian English	lb.	.09 @	.10
Domestic (Maroon)	lb.	.11 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red, f.o.b. Easton	lb.	.08¾@	—

Whites

Lithopone, Albalith	lb.	.04½@	.04¾
Lithopone, Azolith	lb.	.04½@	.04¾
Titanium oxide	lb.	.17 @	.19
Titanox B	lb.	.06 @	.06½
Titanox C	lb.	.06 @	.06½

Zinc Oxide—American Process

American Azo:

ZZZ (lead free)	lb.	.05¾@	.06
ZZ (leaded)	lb.	.05½@	.05¾

Horsehead Lead Free Brand:

Selected	lb.	.05¾@	.06
Special	lb.	.05¾@	.06
XX Red	lb.	.05¾@	.06
XX	lb.	.05¾@	.06
XX Green	lb.	.05¾@	.06
Leaded Brand, Standard	lb.	.05¼@	.05¾
Sterling	lb.	.05½@	.05¾
Superior	lb.	.05½@	.05¾
Lehigh	lb.	.05¼@	.05½
U. S. P., bbls.	lb.	— @	.12¾
Kadox, black label	lb.	.09⅝@	.09⅞
Blue label	lb.	.08⅝@	.08⅞
Red label	lb.	.07¼@	.07½
Cryptone, No. 19	lb.	.06½@	.06¾
Cryptone CB, No. 21	lb.	.06½@	.06¾
XX Zinc Sulphide, bbls.	lb.	— @	.13
St. Joe, black label	lb.	.05¾@	.06
green label	lb.	.05¾@	.06
red label	lb.	.05¾@	.06

Zinc Oxide—French Process

Anaconda, lead free	lb.	.05¾@	.06
Anaconda, selected lead free	lb.	.06¼@	.06½
Florence White seal, bbls.	lb.	— @	.10⅞
Green seal	lb.	.09¾@	.09⅞
Red seal	lb.	.08⅝@	.08⅞

Yellows

Chrome	lb.	.16 @	.16½
Ocher, dom. med.	lb.	.01½@	.02

BLACKS

Arrow "Aerfloted"			
c.l. f.o.b. works, bags	lb.	.02¾@	—
c.l. f.o.b. works, cases	lb.	.04¼@	—
less c.l. f.o.b. works	lb.	.05¼@	.07
Arrow "Aerfloted" Specification, c.l. f.o.b. wks., bags	lb.	.03 @	—
Bone, powdered	lb.	.05½@	.12½
Carbon, compressed	lb.	.02¾@	.07
uncompressed	lb.	.02¾@	.07
"Certified," Cabot			
c.l. f.o.b. works, bags	lb.	.02¾@	—
c.l. f.o.b. works, cases	lb.	.04¼@	—
less c.l. f.o.b. works	lb.	.05¼@	.07
Spherons	lb.	.02¾@	—
"Disperso" f.o.b. La.	lb.	.028 @	.071
f.o.b. Texas	lb.	.02¾@	.07
Drop, bbls.	lb.	.05½@	.14
"Excello," compressed	lb.	.03 @	—
"Fumonex"	lb.	.02½@	.06
"Gastex"	lb.	.02½@	.06
Lampblack	lb.	.06 @	.08
"Micronex"			
c.l. f.o.b. works, bags	lb.	.03 @	—
c.l. f.o.b. works, cases	lb.	.04½@	—
less c.l. f.o.b. works	lb.	.05½@	.07
"Supreme"	lb.	.02¾@	—
Thermatomic—"P 33"	lb.	—	—
"Thermax"	lb.	—	—
United, "Dixie" and "Kosmos"			
c.l. f.o.b. works, bags	lb.	.02¾@	—
c.l. f.o.b. works, cases	lb.	.04¼@	—
less c.l. f.o.b. works	lb.	.05¼@	.07
"Velvetex"	lb.	.02 @	.05

COMPOUNDING MATERIALS

Aluminum Flake	ton	21.85 @	24.50
Ammonia carbonate, lump	lb.	.10½@	.12
Asbestine	ton	13.40 @	14.00
Barium carbonate (98-100%)	lb.	.05 @	—
Barium Dust	lb.	.05 @	.06
Barytes southern off-color	ton	12.00 @	18.00
Western prime white	ton	33.00 @	—
Basofor	lb.	.04½@	—
Bentonite	lb.	.02 @	.03
Blanc fixe dry f.o.b. works	ton	60.00 @	75.00
Carrara filler	lb.	.01¾@	.02
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	60.00 @	70.00
heavy	ton	45.00 @	55.00
Clay, Kaolin, domestic	ton	6.00 @	7.00
Aerfloted, Suprex	ton	6.50 @	8.00
Congaree	ton	9.00 @	—
Dark Blue Ridge	ton		
Dixie	ton		
Langford	ton		
Lexington	ton	10.00 @	22.00
Par	ton		
Tensulite		15.00 @	—
Cotton Flock	lb.	.08 @	.16
Glues, extra white	lb.	.15 @	.22
medium white	lb.	.12 @	.14
Kalite No. 1	ton	30.00 @	55.00
Kalite No. 3	ton	40.00 @	65.00
Magnesia, carbonate	lb.	.05¾@	.06
Mica	lb.	.04 @	—
Rottonstone (powdered)	ton	23.50 @	28.00
Soapstone, powdered	ton	16.00 @	18.00
Starch, powdered	cwt.	2.34 @	—
Talc, domestic	ton	12.00 @	15.00
Pyrax A	ton		
Whiting, commercial	cwt.	.85 @	1.10
English cliffstone	cwt.	1.50 @	1.70
Sussex	ton		
Witco	ton	20.00 @	—
Zinc Carbonate	lb.	.10¼@	—
Zinc Stearate	lb.	.20½@	—

MINERAL RUBBER

Genasco (factory	ton	40.00 @	42.00
Granulated M. R.	ton		
Hard Hydrocarbon	ton		
Parmr, solid	ton	28.00 @	28.00
Pioneer, MR, sclid	ton	40.00 @	42.00
Pioneer-granulated	ton	50.00 @	52.00
R & H Hydro-Carbon	ton	27.05 @	29.00

SOFTENERS

Acids

Nitric, 36 degrees	cwt.	5.00 @	5.25
Sulfuric, 66 degrees	cwt.	1.60 @	1.95
Tartaric, crystals	lb.	— @	.26½

Acids, Fatty

Laurex	lb.	.15 @	.16
Stearex	lb.	.08 @	.12
Stearic, double pressed	lb.	.08 @	.12

Alkalies

Caustic soda, 76%	cwt.	2.50 @	2.90
Soda Ash, 58% C.L.	cwt.	1.15 @	1.17½

Oils

Corn, refined, bbls.	lb.	.05½@	.06
Cottonseed, crude		.03½@	.04
Degras (c.l. 100 bbls.)	lb.	.02¾@	—
Less c.l. (10-25 bbls.)	lb.	.03 @	—
Lots less than 10 bbls.	lb.	.03¼@	—
Fluxrite	lb.	.05½@	.06½
Palm Lagos	lb.	.03¼@	.03½
Niger	lb.	.02¾@	.03
Para-Flux	gal.	.17 @	—
Petrolatum, white	lb.	.08 @	.08½
Pigmentaroil	gal.	.13 @	.18
Pine, steam distilled	gal.	.59 @	.61
destructively distilled	gal.	.56 @	.58
Witco Palm Oil	lb.	.07½@	—
Witco Softener (f.o.b. wks.)	lb.	.02 @	—

Resins and Pitches

Pitch, Burgundy	lb.	.05 @	.06
coal tar	gal.	.05½@	.06
pine, 200 lb. gr. wt.	bbl.	6.00 @	—
Rosin, grade K, 280 lb.	bbl.	4.35 @	—
Pigmentar	gal.	.13 @	.18
Tar Retort, 50 gal.	bbl.	10.00 @	11.00

Solvents

Acetone, pure	lb.	.10 @	.13
Alcohol, denatured, No. 1 bbls.	gal.	.30½@	.45½
Benzol, 90%	gal.	.20 @	.21
Carbon, bisulfide	lb.	.05½@	.06¼
Carbon, tetrachloride	lb.	.06¼@	.07
Dipentene	gal.	.31 @	.41
Dryolene (f.o.b. Okla.)	gal.	.10 @	.10½
Gasoline, steel bbls.	gal.	.16 @	—
Naphtha, solvent	gal.	.26 @	.28
Rub-Sol (f.o.b. Okla.)	gal.	.09 @	—
Turpentine, spirits	gal.	.45¼@	—
wood	gal.	— @	.40
destructively distilled	gal.	.35 @	—

Waxes

Beeswax, white	lb.	.30 @	.32
Carnauba	lb.	.25 @	.26
Ceresin, white	lb.	.10 @	.11
Montan, crude	lb.	.05 @	.06
Ozokerite, black	lb.	.24 @	.25
green	lb.	.26 @	.30

Paraffin (c.l.—f.o.b. N. Y.)

Yellow crude scale	lb.	.02 @	—
White crude scale 124/126	lb.	.02 @	—
Refined, 125/127	lb.	.02¾@	—
Refined, 128/130	lb.	.03¼@	—
Refined, 135/137	lb.	.04 @	—
Refined, 138/140	lb.	.06¾@	—

ANTI-OXIDANTS

AgeRite, Gel	lb.		
Powder	lb.		
Resin	lb.		
White	lb.		
Albasan	lb.	.70 @	.75
Antox	lb.		
B-L-E	lb.	.57 @	.60
Neozone	lb.		
Oxynone	lb.	.68 @	.80
Resistox	lb.	.54 @	.57
Retardex	lb.	.35 @	.40
Stabilite	lb.	.57 @	.62
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.55 @	.66

SPECIALTIES

Aromatics- Rodo	lb.		
Sunproof	lb.	.35 @	.37½
Sponge Paste	lb.	— @	.30
Tonox	lb.	.56 @	.60

SUBSTITUTES

Black	lb.	.06 @	.08
White	lb.	.08 @	.12
Brown	lb.	.07 @	.11

VULCANIZING INGREDIENTS

Sulfur Chloride (drums)	lb.	.04 @	—
Sulfur flour,			
Ref'n'd, 100% pure (bags)	cwt.	2.40 @	2.75
Commercial (bags	cwt.	1.75 @	2.10
Telloy	lb.		
Vandex	lb.		

A Section Devoted to Listings of Leading Producers and Distributors of Raw Materials, Machinery and Equipment, and Supplies for the Rubber Industry.

The Market Place

Chemicals and Compounding Materials — Machinery and Equipment—Crude, Reclaimed and Scrap Rubber—Fabrics—Rubber Products — Consulting Engineers.

Chemicals and Compounding Materials —

ACCELERATORS
A-7 A-11 A-16 A-19 A-32 Z-88
A-5-10, DPG. THIO
RESISTOX, OXYNONE
The RUBBER SERVICE LABORATORIES CO.
611 Peoples Savings & Trust Bldg.
Akron, Ohio

ANTIMONY Pentasulphide, golden and crimson, very fine, pure.
Rare Metal Products Co.
Belleville, N. J.
Direct Factory Representation

ASBESTINE—Specially prepared for use in Rubber. Send for liberal working samples.
SOLE PRODUCERS
International Pulp Co.
41 Park Row New York City

CARBON BLACK—*Micronex* the world's standard gas black, universally known as the "King of Rubber Pigments."
Binney & Smith Co.
41 East 42nd St. New York City

CABOT CERTIFIED CARBON BLACK
Godfrey L. Cabot, Inc.
Manufacturers for fifty years
940 Old South Bldg., Boston, Mass.

CARBON BLACK—*Aerfloted*
Arrow Black for rubber compounding. Standard for grit-free uniformity.
J. M. Huber, Inc.
460 West 34th St. New York

CARBON BLACK
SUPREME—*the up-to-date standard for rubber*
Imperial Oil & Gas Products Co.
Union Bank Bldg., Pittsburgh, Pa.

In Times Such as These

•

—when suppliers have to curtail expenses drastically, they can most economically keep their names before customers by using space in the

MARKET PLACE

—that section of THE RUBBER AGE where the products of all the leading sellers of chemicals, equipment and other supplies and services are listed regularly.

•

The cost is only $5 a month for each listing.

CARBON BLACK
DIXIE—KOSMOS—TRIANGLE
United Carbon Company
Manufacturers 1/3 the World's Supply
Chicago, New York, San Francisco, Akron, Charleston, W. Va.

CATALPO—The universal and standard rubber pigment now being used in treads, solids, tubes, carcass frictions, etc.
Moore & Munger
33 Rector Street. New York City

CHEMICALS
For Rubber: *Accelerators, Antioxidants, Specialties*
For Industry Generally: *Acids, Oil of Myrbane, Aniline Oil, Latex, Lotol, Dispersions*
The Naugatuck Chemical Co.
1790 BROADWAY NEW YORK

CHEMICALS and compounding ingredients; Clay, Whiting, Accelerators, Mineral Rubber.
R. T. Vanderbilt Co.
230 Park Ave. New York City

CHEMICALS and Mineral Ingredients—Whiting, Clay, Talc, Barytes, Colors. Heavy Calcined Magnesia. Carbonate of Magnesia, Pumice Stone.
Standard Since 1890
Whittaker, Clark & Daniels, Inc.
245 Front St., New York

COLLOIDAL SULPHUR
COLLOIDAL ZINC OXIDE
COLLOIDAL COLORS
Heveatex Corporation
78 Gooodyear Ave., Melrose, Mass.
Offices in New York, Akron, Chicago

COLORS—*for Rubber*
Fine organic colors—Reds, Blues, Oranges, Violets, Greens—or any shade to meet your requirements—also Rubber Dispersed Colors
Ansbacher-Siegle Corporation
Rosebank, Staten Island, N. Y.
820 So. Clinton St., Chicago, Ill.
Agents in Principal Cities

COLORS
BRILLIANT ORGANIC DYES; PERMANENT, NON-BLEEDING, LOW COST For All Cures
The RUBBER SERVICE LABORATORIES CO.
611 Peoples Savings & Trust Bldg.
Akron, Ohio

CUMAR—Paracumarone Resin.
A neutral gum for rubber compounding.
Samples and prices on request.
The Barrett Company
40 Rector St. New York City

THE MARKET PLACE Section Continued on Next Page

A Section Devoted to Listings of Leading Producers and Distributors of Raw Materials, Machinery and Equipment, and Supplies for the Rubber Industry.

The Market Place

Chemicals and Compounding Materials — Machinery and Equipment—Crude, Reclaimed and Scrap Rubber—Fabrics—Rubber Products — Consulting Engineers.

Chemical and Compounding Materials (continued)

DU PONT Rubber Chemicals
DU PONT RUBBER COLORS
DU PONT ACCELERATORS
DU PONT ANTI-OXIDANTS
E. I. du Pont de Nemours & Co., Inc.
RUBBER CHEMICALS SECTION
WILMINGTON, DELAWARE

FACTICE—Prevents blooming, makes colors fast and a smoother batch.
Stamford Rubber Supply Co.
Stamford, Conn.

GASTEX
Reinforcing Black—Improves ageing properties of rubber—Does not retard rate of cure.
General Atlas Carbon Co.
60 Wall St., New York

IRON OXIDES
Asbestine—Barytes—Talc—Soapstone
C. K. Williams & Co.
EASTON, PA.

MANY BIG advertisers started with little space. Spaces in this section are small in size but big in returns. Try one.

The first place Chemists turn to when seeking the maker of any chemical is the
MARKET PLACE
If your products are not listed here you may miss out on a sale. *List your products here.*

PARA-FLUX
The Universal Softener—Adaptable, Uniform, Improves Quality—Economical.
The C. P. Hall Co.
Central Depositors Bank Bldg.
Akron, Ohio

RED OXIDE —A special-grinding, guaranteed uniform in color and quality.
Joseph A. McNulty
114 Liberty St. New York City

RUBBER SUBSTITUTES
White, brown and black.
Carter Bell Mfg. Co.
150 Nassau St. New York

SOFTENERS—Fluxrite
We are specialists in softeners and invite your investigation.
Damascus Manufacturing Co.
Cleveland, Ohio

STEARIC ACID
STEAREX . . . CAKE or POWDER
STEAREX FLAKE
Standardized Products for Rubber Compounding
MINERAL RUBBER (Parmr) TALC
SOAPSTONE. CHINA CLAY
Binney & Smith Co.
41 East 42nd St., New York City

WHITING & PARIS WHITE
manufactured from *Genuine English Chalk* and *Cliffstone*—no adulterations.
Southwark Mfg. Co.
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ZINC OXIDES
Red, White & Green Seal (French Process)
Selected and Lead Free
ANACONDA
Super Pure, made from Anaconda Electrolytic Zinc
Anaconda Zinc Oxide Dept. of I. L. R. Co.
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ZINC OXIDE PIGMENTS
The XX Reds Kadox
ZINC SULPHIDE PIGMENTS
"Albalith"—super lithopone
Cryptone—high zinc sulphide pigment
XX Zinc Sulphide
The New Jersey Zinc Sales Co.
New York Cleveland San Francisco Chicago

ZINC OXIDES
Black Label Red Label
Manufactured by Our New Electrothermic Process
St. Joseph Lead Co.
250 Park Ave., New York
Oliver Bldg., Pittsburgh, Pa.
Plant and Laboratory: Josephtown, Pa.

Where Can I Get . . . ?

When the product sought is one you manufacture, the Buyer should be able to find it in this section. Is Yours Listed Here?

A Section Devoted to Listings of Leading Producers and Distributors of Raw Materials, Machinery and Equipment, and Supplies for the Rubber Industry.

The Market Place

Chemicals and Compounding Materials — Machinery and Equipment—Crude, Reclaimed and Scrap Rubber—Fabrics—Rubber Products — Consulting Engineers.

Machinery and Equipment

CALENDER SHELLS
For all purposes—Super, Heavy Duty and Standard—Also
ALL-METAL STOCK BOOKS
Light—Strong—Smooth
The W. F. GAMMETER CO.
Cadiz Ohio

MACHINERY—
Adhesive Mixers and Spreaders (Coating Machines).
Presses—Hydraulic and Screw.
Power Pumps—Vertical and Horizontal.
Automatic Pressure Regulators.
Special Hydraulic Valves.
CHAS. E. FRANCIS CO.
RUSHVILLE, IND.

STOCK SHELLS
A Type for Every Need—Large Diameter—Light Weight—Extra Strong—Seamless.
National Sherardizing & Machine Co.
Hartford, Conn. Akron, Ohio

LABORATORY Apparatus
Bierer-Davis Aging Apparatus; Emerson Water Bath; Rubber Buffing Machine; Emerson Fuel Calorimeter; Emerson Textile Conditioning Ovens.
Emerson Apparatus Co.
Melrose, Mass.

MACHINERY
Cutting, Trimming, Skiving, Cementing, Eyeletting.
Cutting Dies—Eyelets.
United Shoe Machinery Corp.
140 Federal St., Boston, Mass.

TESTING MACHINES
RUBBER TENSILE TEST MACHINES
TEXTILE TESTING MACHINES
Write for Descriptive Literature
Henry L. Scott Co.
P. O. Box 963 Providence, R. I.

MACHINERY—RUBBER
"MASTER" Tube Molds, Tire Vulcanizers, Molds and Cores, Tire Drums, Tubers, etc.
Special Machinery Built to Order
Akron Standard Mold Co.
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MANDRELS—All Types
Circular and Straight—Aluminum and Steel
For Inner Tubes, Hose, Jar Rings, etc.
Sherardizing and Chrome Plating
Machinery—Air Bag & Mandrel Polishing
National Sherardizing & Machine Co.
Hartford, Conn. Akron, Ohio

TUBING, INSULATING and Straining Machinery
"Perfected" equipment for inner tubes, treads, and tire beads. Circular hose looms.
John Royle & Sons
Paterson, New Jersey

MACHINERY
Clicking, Cutting, Skiving, Eyeletting and Parsons Dieing Out Machines.
Hamlin Machine Company
130 Eastern Ave., Lynn, Mass.

MOLDS AND CORES—
Tire building equipment: general machine work.
TIRE REPAIR EQUIPMENT
The Akron Equipment Co.
Akron, Ohio

USED MACHINERY
We have on hand, ready for prompt shipment, GUARANTEED machinery for every branch of the rubber trade.
L. Albert & Son
Trenton, N. J. Akron, O.

Miscellaneous — Consultants, Special Products, Manufactured Rubber Goods

CHEMIST, Consulting—
Testing, formulae, costs, experimental work on all classes of rubber products.
Fred'k. J. Maywald, F.C.S.
307 Hoboken Rd., Cor. 10th St., Carlstadt, N. J.

MECHANICAL MOLDED RUBBER GOODS
Your Inquiries Solicited
Barr Rubber Products Co.
Sandusky, Ohio

CONSULTING
Rubber Technologist
R. R. Olin Laboratories
P. O. BOX 372, AKRON, OHIO
Telephones: Sherwood 3724, Franklin 8551

SANITARY GOODS—
Dress Shields, Baby Pants, Aprons, Elastic Belts, Bloomers, Stepins, Bibs, Guimps and Brassieres.
SPECIAL GOODS CUT TO ORDER
Rand Rubber Co., Inc.
Sumner Ave. & Halsey St., Brooklyn, N. Y.

Do you BELIEVE in your products?
Then you should believe in telling the rubber industry all about them. The MARKET PLACE is the logical place to display your wares.

In this section are listed the products of the leading producers of materials and equipment used by rubber manufacturers.

When buyers refer to these pages for their needs, your name and address and a description of your products should be available here. The cost of a one-inch listing is only $5.00 per issue—the lowest cost of advertising space available in the rubber field.

THE RUBBER AGE
250 West 57th St., New York

THE MARKET PLACE Section Continued on Next Page

A Section Devoted to Listings of Leading Producers and Distributors of Raw Materials, Machinery and Equipment, and Supplies for the Rubber Industry.

The Market Place

Chemicals and Compounding Materials — Machinery and Equipment—Crude, Reclaimed and Scrap Rubber—Fabrics—Rubber Products — Consulting Engineers.

Rubber — Crude, Scrap, Reclaimed, Latex

CRUDE RUBBER
Scrap Rubber, Hard Rubber Dust
We Solicit Your Inquiries
H. Muehlstein & Co., Inc.
41 East 42nd St. New York City
Offices in Akron, Chicago, Boston

RECLAIMED RUBBER—
Uniformity, reliability, cleanliness
Pequanoc Rubber Co.
Butler, N. J.

REVERTEX
Highly Concentrated (About 75%)
RUBBER LATEX
Sole Distributors for U. S. A. and Canada
Revertex Corp. of America
40 Rector St., New York, N. Y.

CRUDE RUBBER
LIQUID LATEX
Members Rubber Exchange of N. Y., Inc., and Rubber Exchange Clearing House, Inc.
Charles T. Wilson Co., Inc.
99 Wall St. New York
AKRON OFFICE: 507 Second Natl. Bldg.

RECLAIMED RUBBER—
of Standardized Quality
Philadelphia Rubber Works Co.
Akron, Ohio

RUBBER LATEX
Normal, Concentrated and Processed for All Requirements
Heveatex Corporation
78 Goodyear Ave., Melrose, Mass.
Offices in New York, Akron, Chicago

GUAYULE "Duro" Brand and AMPAR Rubber, washed and dried ready for compounding.
High Grade PLANTATION RUBBER from our own Estates
Continental Rubber Co. of N. Y.
745 Fifth Avenue New York

RECLAIMED RUBBER—
A standardized grade for every requirement.
U. S. Rubber Reclaiming Co.,Inc.
500 Fifth Ave., New York, N. Y.
"50 Years Serving the Industry Solely as Reclaimers"

RUBBER FACTORIES
use vast quantities of raw materials and equipment. Let the industry know how well you can serve it through a listing in this section.

RECLAIMED RUBBER—
For All Purposes
Naugatuck Chemical Co.
1790 Broadway, N. Y. City

RECLAIMED RUBBER—
Prompt, efficient handling of orders—Technical assistance—stability of supply—250,000 lbs. daily capacity.
XYLOS RUBBER CO.
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Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

	Gross Imports			Re-exports			Net Imports
YEARS	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,338	505,817,807	54.63	17,671	22,470,583	56.77	395,667
1927	426,258	339,874,774	35.60	27,775	24,735,488	39.76	398,483
1928	439,731	244,854,973	25.03	32,159	18,128,361	25.17	407,572
1929	560,084	239,178,783	19.15	36,485	16,868,733	20.64	523,599
1930	482,082	139,134,330	12.89	30,205	9,316,205	13.77	451,877
1931	497,138	72,918,949	6.54	25,595	4,255,472	7.42	471,543
1932	409,584	31,936,459	3.47	20,929	2,015,612	4.30	388,655
1931:							
Jan.	36,307	7,190,591	8.84	1,706	350,480	9.17	34,601
Feb.	34,005	6,564,969	8.62	1,799	357,078	8.86	32,206
Mar.	40,393	7,356,505	8.13	2,800	534,180	8.52	37,593
Apr.	44,536	7,712,941	7.73	2,607	528,947	9.06	41,929
May	35,526	5,886,638	7.40	2,501	418,301	7.47	33,025
June	46,233	6,918,900	6.68	2,749	440,604	7.15	43,484
July	43,469	6,023,748	6.19	1,435	223,587	6.96	42,034
Aug.	38,669	5,138,404	5.93	2,324	345,953	6.65	36,345
Sept.	38,494	4,970,324	5.76	1,362	187,431	6.14	37,132
Oct.	41,131	4,803,582	5.21	1,527	203,574	5.95	39,604
Nov.	43,345	4,742,218	4.72	1,403	198,284	6.31	43,345
Dec.	53,536	5,610,120	4.68	2,462	326,382	5.91	51,070
1932:							
Jan.	33,221	3,387,505	4.55	1,524	185,466	5.43	31,697
Feb.	27,959	2,690,250	4.29	1,915	222,584	5.19	26,044
Mar.	45,197	4,251,801	4.19	2,227	240,128	4.84	42,970
April	37,903	3,181,343	3.74	2,128	196,934	4.53	35,775
May	34,182	2,798,914	3.71	1,505	144,561	4.30	32,677
June	40,808	2,647,085	2.89	1,981	134,336	3.02	39,136
July	32,306	2,102,915	2.91	2,030	179,699	3.95	30,276
August	33,449	2,027,045	2.71	1,339	128,952	4.29	32,110
Oct.	35,096	2,436,522	3.10	1,059	98,022	4.13	34,037
Nov.	28,908	2,263,469	3.48	1,745	158,618	40.6	27,163
Dec.	31,384	2,360,061	3.34	770	66,165	39.8	30,614

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All quantities in Long Tons)

	Guayule		Balata		Jelutong		Liquid Latex (1)	
	Tons	Dollars	Tons	Dollars	Tons	Dollars	Tons	Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,353	3,537,810
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,388	4,680,386
1927	5,018	2,674,957	582	447,246	7,785	2,448,657	1,116	876,077
1928	3,075	1,755,685	731	430,855	7,552	2,540,059	4,167	2,185,579
1929	1,231	545,175	728	566,964	8,203	2,458,136	3,728	1,787,997
1930	1,096	347,388	501	422,684	5,907	1,403,244	4,449	1,506,804
1931	——	——	1,208	411,692	5,777	1,019,010	4,650	884,355
1932	——	——	708	147,403	4,607	616,596	5,085	601,999
1932:								
Jan	—	——	54	14,095	633	81,396	331	40,613
Feb.	—	——	100	24,702	558	84,914	439	52,183
Mar.	—	——	114	20,628	460	59,299	391	44,585
Apr.	—	——	46	10,909	317	44,165	551	46,397
May	—	——	42	9,863	566	68,028	141	27,449
June	—	——	38	9,483	330	47,077	309	28,800
July	—	——	26	7,934	372	52,116	218	37,327
Aug.	—	——	36	8,885	367	46,926	540	59,178
Sept.	—	——	11	2,261	216	27,265	297	46,380
Oct.	—	——	84	17,451	349	48,816	711	69,053
Nov.	—	——	134	15,983	163	20,296	526	70,785
Dec.	—	——	22	5,209	276	36,298	632	79,250

(1) Latex import figures not available before 1924.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

Figures on Monthly Basis

	1925	1926	1927	1928	1929	1930	1931	1932
Jan.	29,638	32,196	31,518	34,403	43,002	36,194	28,557	27,962
Feb.	29,761	31,136	30,137	33,702	41,594	33,302	28,797	30,011
Mar.	33,498	32,936	36,141	35,688	44,730	35,540	32,788	27,828
Apr.	34,139	32,696	35,871	32,772	47,521	39,686	33,321	25,953
May	35,322	29,364	34,592	37,333	49,233	39,386	37,817	29,197
June	35,822	28,598	33,801	37,676	43,227	34,195	37,916	29,116
July	36,053	27,577	29,219	37,407	41,526	29,508	31,937	28,272
Aug.	35,909	34,533	33,460	42,927	38,274	30,850	27,586	22,372
Sept.	31,691	32,904	27,214	39,882	34,707	25,515	23,638	22,491
Oct.	29,047	29,936	26,790	40,857	34,800	27,516	22,277	21,018
Nov.	28,253	28,080	26,792	37,461	27,659	23,691	22,943	21,910
Dec.	28,748	26,293	25,492	31,232	28,531	21,687	21,409	16,990
Totals	388,481	366,149	371,027	441,340	469,804	375,980	348,986	313,122

Figures on Quarterly Basis

Quarter	1925	1926	1927	1928	1929	1930	1931	1932
Jan./Mar.	95,263	94,301	99,216	103,558	128,565	101,610	89,652	85,309
Apr./June	104,099	87,109	103,242	103,500	139,292	112,229	107,755	92,643
July/Sept.	99,493	93,793	89,210	117,573	113,746	85,261	83,632	72,523
Oct./Dec.	85,789	83,212	80,860	117,597	84,872	72,020	65,645	——
Totals	384,644	358,415	372,528	442,227	466,475	371,120	346,684	——

Note—The Rubber Association estimates its monthly rubber consumption figues to be 80 per cent complete. Up until 1925 the quarterly figures were likewise estimated to be 90 per cent complete; beginning with 1925 an estimate of 92 per cent completeness has been used. These estimates have been used in raising the figures in this table to 100 per cent. The quarterly figures are generally regarded as the most authentic; the monthly figures may be accepted as preliminary.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption Tons	Consumption % to Crude	Stocks*	Year	Production	Consumption Tons	Consumption % to Crude	Stocks*
1921	36,725	41,351	24.1	.....	1926	180,582	164,500	45.9	23,218
1922	57,834	54,458	19.3	.....	1927	189,144	178,471	47.6	24,980
1923	74,766	69,534	22.7	.....	1928	208,516	223,000	50.4	24,785
1924	80,079	76,072	22.4	.....	1929	218,954	226,588	48.4	27,464
1925	132,930	137,105	35.6	13,203	1930	157,967	153,497	40.8	22,000
1931:									
Jan.	10,349	10,728	37.6	22,429	July	11,393	11,447	35.8	17,720
Feb.	10,871	10,800	37.5	18,878	Aug.	10,110	9,972	36.2	17,165
Mar.	12,938	12,524	38.3	18,375	Sept.	9,629	8,932	37.6	17,226
Apr.	13,267	11,745	35.0	18,356	Oct.	9,482	8,126	36.6	17,741
May	13,478	13,103	34.6	18,088	Nov.	7,892	7,492	32.6	17,662
June	14,066	13,045	34.4	18,505	Dec.	8,876	6,812	31.8	19,257
1932:									
Jan.	8,753	8,440	30.2	18,712	July	5,417	5,131	18.1	16,333
Feb.	8,731	8,332	27.7	18,659	Aug.	3,264	4,382	18.6	14,629
Mar.	8,613	7,420	26.7	19,721	Sept.	5,308	5,235	23.2	14,059
Apr.	5,561	5,555	21.6	21,525	Oct.	6,605	5,494	26.1	13,911
May	5,024	6,070	20.8	18,889	Nov.	6,542	5,234	23.9	14,047
June	5,923	7,031	18.0	16,870	Dec.	5,626	3,968	23.4	15,202

* Stocks on hand at the end of month or year.

(Rubber Manufacturers' Association figures raised to 100%)

U. S. Consumption of Gasoline

(In Thousands of Barrels of 42 Gallons)

	1930	1931	1932		1930	1931	1932
January	25,731	26,844	26,845	July	38,256	39,459	31,317
February	26,509	26,133	25,344	August	37,433	39,459	35,207
March	31,029	31,087	29,451	September	37,823	36,670	33,645
April	34,549	33,400	30,252	October	32,267	35,051	32,255
May	36,497	35,716	31,574	November	30,984	30,640	30,294
June	35,902	38,375	38,766	December	29,094	30,529	27,191

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

1931	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
January	—	8⅝	8⅝	—	8½	8⅝	8⅝	8⅝	8⅝	8⅝	—	8⅝	8⅝	8⅝	8½	8⅝	8⅝	—	8¼	8¼	8¼	8¼	8¼	8¼	8¼	8¼	8¼	8¼	8½	8½	8	8	8⅜
February	—	7⅛	7⅛	7⅜	7⅛	7⅛	7⅛	—	7⅛	—	7⅛	—	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7½	—	7½	7⅛	7⅛	7⅛	7⅜	—	—	—	—	7⅛
March	—	—	7⅜	8	8¼	8¼	8¼	8	7⅞	8	—	7⅞	—	7⅞	7⅞	7⅞	7⅞	7⅞	7⅞	7⅞	7⅞	—	—	7⅞	—	—	7	7	—	—	—	7⅛
April	—	6⅝	—	—	6⅝	6⅝	6⅝	—	6⅝	6⅝	6⅝	6⅝	6⅝	6⅝	6⅝	6⅝	6⅝	6⅝	6⅝	6⅝	6⅝	6⅝	6⅝	6	6	6	6	6	6	6	6	6½
May	—	6	—	—	6⅛	6¼	6¼	—	6⅜	6⅜	—	6⅜	6⅜	6⅜	6½	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6½	6½	6½	—	—	6½
June	—	6⅜	6⅜	6½	6¼	6¼	6¼	6⅜	6⅜	6¼	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6½	6½	6½	—	6⅜
July	—	6⅜	6⅜	—	6⅜	6⅜	6½	—	6⅜	6⅜	—	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6¼	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	—	6⅜
August	—	6⅝	6⅝	—	6⅝	6½	—	—	6⅝	6⅝	—	6½	6⅝	6⅝	6⅝	6⅝	6⅝	6⅝	6⅝	6⅝	6⅝	6⅝	6⅝	6¼	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	—	6⅜
September	—	6⅛	6⅛	—	6⅛	6⅛	—	—	6⅛	6⅛	—	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	—	6⅛
October	—	5⅝	—	—	5⅝	5⅝	—	—	5⅝	5⅝	—	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	5⅝	—	5⅝
November	3 7/16	3 7/16	3 7/16	3 7/16	3 9/16	—	3 9/16	—	3 9/16	—	3½	—	3 9/16	—	3½	3 9/16	—	3¾	3¼	3¼	—	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜
December	—	3⅝	3⅝	3⅝	3⅝	—	3¼	3¼	3¼	3¼	3¼	—	3¼	3¼	3¼	3¼	—	3¼	3¼	3¼	3⅜	3⅜	3¼	3¼	3¼	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3¼
1932																																
January	—	—	4⅛	4⅛	4½	4⅝	4⅝	4⅝	—	4⅝	4⅝	4⅝	4⅝	4⅝	4⅝	4⅝	—	4½	4⅝	4⅝	4⅝	4⅝	4⅝	—	4¼	4¼	4¼	4⅜	4⅜	—	—	4⅛
February	—	4⅜	4⅛	4⅛	4⅛	4⅛	—	3⅝	4⅛	4⅛	—	3⅝	4⅛	4⅛	—	3⅝	3 11/16	3 9/16	—	3½	3½	3 7/16	3 7/16	3 7/16	3 13/16	3 15/16	—	3 7/16	3 9/16	3½	3 9/16	—	3⅝
March	—	3⅝	3½	3½	3½	3½	3⅝	3½	3⅝	3⅝	—	3⅝	3⅝	3⅝	3¼	3⅝	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3 13/16	3 13/16	3 13/16	3 15/16	3⅝	3⅝	3¼	3¼	3½
April	—	3	—	3	3	3	3	3	3	3	—	3⅛	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
May	—	—	3	3¼	3¼	4	4⅜	—	4	3⅝	3¼	3⅛	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞
June	—	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝
July	—	2⅝	—	—	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	—	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝	2⅝
August	—	3¼	3¼	3⅜	3⅜	—	4 11/16	4½	4 5/16	4⅜	4	—	3⅝	3⅝	3 11/16	3 9/16	3 9/16	—	3⅝	3⅝	3⅝	3½	3 7/16	3 7/16	3 13/16	3 15/16	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝
September	—	4¼	4¼	—	4⅜	4⅜	—	4 11/16	4½	4 5/16	4⅜	3⅝	—	—	3 7/16	3½	—	—	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼
October	—	3⅝	—	3⅝	3⅝	3 9/16	3 9/16	3½	3½	—	3 7/16	3½	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
November	3 7/16	3 7/16	3 7/16	3 7/16	3 7/16	3 9/16	—	3 9/16	—	3½	—	3½	3 9/16	—	3½	3 9/16	—	3¼	3¼	3¼	—	3½	3 7/16	3 7/16	3⅝	—	—	—	3 5/16	3 5/16	3⅜	—
December	—	3⅝	3⅝	3 5/16	—	3¼	3¼	3¼	3¼	3¼	—	3¼	3¼	3¼	3¼	3¼	—	3¼	3¼	3¼	3⅜	3⅜	3¼	3¼	3¼	—	—	—	3 3/16	3 3/16	3¼	—
1933																																
January	—	—	3¼	3 3/16	3 3/16	3¼	—	—	3 5/16	3 5/16	3¼	3⅛	3¼	—	3	2 31/32	2 31/32	3	3 1/16	3	—	3	3⅛	3 1/16	3 1/16	2 31/32	2 31/32	—	2 15/16	2 15/16	3	
February																																
March																																

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1925

Year	Cents	Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15	1922	17.50
1911	141.30	1915	65.85	1919	48.70	1923	29.45
1912	121.60	1916	72.50	1920	36.30	1924	26.20
1913	82.04	1917	72.23	1921	16.36	1925	72.46

Average Monthly Price per Pound Since 1926

Month	1926 Cents	1927 Cents	1928 Cents	1929 Cents	1930 Cents	1931 Cents	1932 Cents
Jan.	79.50	38.75	40.25	20.14	15.24	8.34	4.38
Feb.	62.25	38.25	32.75	23.97	15.85	7.70	4.03
Mar.	59.00	41.04	26.82	24.55	15.34	7.71	3.35
Apr.	51.25	40.86	18.97	21.18	14.93	6.43	3.02
May	47.75	40.76	18.99	21.46	14.24	6.49	3.09
June	42.50	37.25	19.59	20.64	12.45	6.35	2.66
July	41.03	34.87	19.40	21.30	11.24	6.37	2.89
Aug.	48.50	35.12	19.46	20.59	9.96	5.38	3.63
Sept.	41.00	33.67	18.47	20.37	8.28	5.08	3.84
Oct.	42.50	34.32	18.83	19.67	8.20	4.87	3.65
Nov.	38.50	37.58	18.26	16.62	9.01	4.65	3.44
Dec.	38.25	40.63	17.97	16.12	9.05	4.64	3.24
Average for Year	48.50	37.72	22.48	20.55	11.98	6.17	3.49

London Closing Prices of Ribbed Smoked Sheet

(In Pence Per Pound)

Day	Oct.	Nov.	Dec.	Jan.	Day	Oct.	Nov.	Dec.	Jan.
1	2⅝	2 15/32	2 9/16	—	17	2 5/16	2 9/16	2 15/32	2¼
2	—	2 7/16	2 17/32	—	18	2 11/32	2 17/32	—	2 5/32
3	2½	2 15/32	2 19/32	2 13/32	19	2 11/32	2 17/32	—	2 5/32
4	2½	2 17/32	—	2 13/32	19	2⅜	2 9/16	2½	2 5/32
5	2 15/32	2 19/32	2 9/16	2 13/32	20	2 7/16	—	2 17/32	2 5/32
6	2 5/32	—	2½	2 13/32	21	2 7/16	2 19/32	2½	2⅛
7	2 15/32	2 21/32	2 9/16	2 13/32	22	2 7/16	2 19/32	2 13/32	—
8	2 15/32	2 21/32	2½	—	23	—	2 19/32	2 13/32	2 5/32
9	—	2⅝	2 13/32	2 7/16	24	2 7/16	2 19/32	—	2 3/16
10	2 7/16	2 19/32	2 7/16	2 7/16	25	2½	2 19/32	—	2 3/16
11	2 13/32	2 21/32	—	2 13/32	26	2½	2⅝	—	2 5/32
12	2 7/16	2 11/16	2 7/16	2 11/32	27	2½	—	—	2⅛
13	2 13/32	—	2 7/16	2 5/16	28	2 17/32	2 19/32	2 15/32	2⅛
14	2 13/32	2 19/32	2 7/16	2 5/16	29	2 9/16	2 23/32	2 7/16	—
15	2 13/32	2 19/32	2 7/16	—	30	—	2 19/32	2 7/16	2 3/32
16	—	2 19/32	2 7/16	2¼	31	2½	—	—	2 1/16

Average Monthly Price Per Pound

Month	1929 Pence	1930 Pence	1931 Pence	1932 Pence	Month	1929 Pence	1930 Pence	1931 Pence	1932 Pence
Jan.	9.942	7.471	4.160	3.052	Aug.	10.505	4.880	2.385	2.654
Feb.	11.875	7.948	3.823	2.760	Sept.	10.160	4.075	2.524	2.485
Mar.	12.135	7.595	3.822	2.047	Oct.	9.620	4.023	2.898	2.425
Apr.	10.490	7.391	3.082	1.876	Nov.	8.442	4.440	2.890	2.518
May	10.717	6.926	3.035	1.825	Dec.	7.958	4.516	3.115	2.444
June	10.580	6.195	3.082	1.750	Average for				
July	11065	5.648	3.048	1.875	Year	10.291	5.926	3.155	2.434

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Day of Month	Nov.	Dec.	Jan.	Day of Month	Nov.	Dec.	Jan.	Day of Month	Nov.	Dec.	Jan.
1	6.10	5.95	——	11	6.70	——	6.25	21	6.15	6.00	6.25
2	6.10	5.80	——	12	6.55	5.95	6.25	22	6.15	5.85	——
3	6.10	5.75	6.10	13	——	5.90	6.25	23	6.05	5.95	6.30
4	6.20	——	6.30	14	6.40	6.20	6.25	24	——	——	6.30
5	6.45	5.70	6.25	15	6.40	6.00	——	25	5.90	——	6.25
6	——	5.80	6.25	16	6.40	6.00	6.15	26	5.90	——	6.20
7	6.30	5.75	——	17	6.40	6.15	6.30	27	——	5.95	6.25
8	——	5.75	——	18	6.35	——	6.20	28	5.80	6.00	6.25
9	6.15	5.90	6.30	19	6.25	6.10	6.25	29	6.00	6.15	——
10	6.45	5.90	6.40	20	——	6.10	6.25	30	5.95	6.10	6.10
								31	——	——	6.00

Average Monthly Price Per Pound

	1930 Cents	1931 Cents	1932 Cents	1933 Cents		1930 Cents	1931 Cents	1932 Cents	1933 Cents
Jan.	17.21	10.27	6.65	6.23	Aug.	12.03	7.21	7.43	——
Feb.	15.62	10.96	6.85	——	Sept.	10.85	6.52	6.30	——
Mar.	15.13	10.90	6.86	——	Oct.	10.63	6.32	6.30	——
Apr.	16.39	10.19	6.16	——	Nov.	10.96	6.44	6.22	——
May	16.43	9.38	5.72	——	Dec.	10.02	6.24	6.00	——
June	14.48	9.05	5.22	——	Average for				
July	13.10	9.28	5.87	——	Year	1357	8.56	6.41	——

World Stocks of Crude Rubber

ON HAND OR AFLOAT TO THE U. S.

At End of	ON HAND 1930	ON HAND 1931	ON HAND 1932	AFLOAT 1930	AFLOAT 1931	AFLOAT 1932	ON HAND AND AFLOAT 1930	ON HAND AND AFLOAT 1931	ON HAND AND AFLOAT 1932
Jan.	131,744	209,487	322,860	61,863	56,187	42,234	193,607	265,674	365,094
Feb.	143,863	212,833	322,117	63,404	63,680	51,728	207,267	276,513	373,845
Mar.	141,843	217,804	334,566	63,646	63,133	44,190	205,489	280,937	378,756
Apr.	148,272	228,382	343,099	63,261	56,700	40,387	211,533	285,082	383,486
May	146,149	220,799	346,231	68,168	73,564	50,453	214,347	294,363	396,684
June	151,551	225,536	345,702	58,657	69,421	43,079	210,209	294,957	388,781
July	152,001	234,822	345,927	58,326	66,873	37,894	210,327	301,695	383,821
Aug.	158,604	240,816	357,342	61,168	61,469	41,282	219,772	302,285	398,624
Sept.	169,927	254,324	365,789	60,923	62,420	46,188	230,851	316,744	411,977
Oct.	185,470	273,456	373,823	51,122	68,427	40,176	236,593	341,883	413,999
Nov.	189,925	292,493	377,996	52,538	77,443	40,876	242,463	369,936	418,875
Dec.	200,998	322,826	———	56,035	53,940	——	257,033	376,766	———

(Rubber Manufacturers' Association figures raised to 100%)

STOCKS IN GREAT BRITAIN

Stocks in London

(No. of Tons in Wharves and Warehouses, including Latex)

At end of	1930	1931	1932	At end of	1930	1931	1932
Jan.	60,434	81,093	67,166	July	81,048	81,317	48,842
Feb.	64,557	82,265	65,942	Aug.	80,931	81,560	47,079
Mar.	68,923	84,736	64,280	Sept.	83,329	79,692	44,942
Apr.	74,676	86,982	61,848	Oct.	77,647	76,778	42,327
May	77,312	86,726	56,089	Nov.	76,887	73,911	40,606
June	80,260	83,071	51,009	Dec.	78,013	69,470	37,407

At End of Recent Weeks

1932	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
July	50,656	50,188	49,327	49,105	48,833
August	48,980	47,713	46,985	47,052	
September	46,982	45,325	46,176	44,986	
October	44,972	44,503	43,729	43,173	42,614
November	42,114	41,528	40,952	41,025	
December	40,267	39,381	38,388	37,862	
December	40,267	39,381	38,388	37,862	37,741
1933					
January	37,410	37,361	37,615	36,852	

Stocks in Liverpool

1932				
January	57,718	57,652	58,662	58,328	58,182
February	59,155	59,874	59,514	59,868	
March	60,288	60,776	60,922	60,775	
April	61,010	60,872	61,302	61,433	61,480
May	61,674	60,909	60,583	60,148	
June	60,119	59,551	58,601	58,441	
July	58,569	58,335	57,622	57,618	57,366
August	58,019	57,762	57,542	57,448	
September	58,080	57,965	58,028	58,004	
October	58,261	58,209	57,831	57,568	57,702
November	57,311	57,329	57,021	56,004	
December	55,774	55,311	54,841	54,907	55,056
1933					
January	57,711	52,950	53,183	52,415	

STOCKS IN PENANG AND SINGAPORE

(Stocks held by Dealers—Quantities in Long Tons)

End of	1929	1930	1931	1932	End of	1929	1930	1931	1932
Jan.	29,617	39,727	48,802	48,850	July	38,859	45,459	51,208	17,017
Feb.	32,373	44,371	49,283	46,954	Aug.	30,334	48,132	48,971	20,849
Mar.	29,437	45,657	49,590	46,591	Sept.	32,138	44,015	47,025	20,415
Apr.	26,474	43,473	45,868	39,663	Oct.	33,770	39,930	52,132	23,158
May	30,764	44,715	44,278	35,690	Nov.	30,963	41,674	46,497	25,419
June	30,403	42,451	47,517	19,770	Dec.	35,548	45,963	45,795	25,341

STOCKS IN OTHER CENTRES

End of 1932:	Malaya Mainland	Afloat for Europe	Holland	Colombo	Para and Manaos
Jan.	43,938	19,090	3,065	3,956	6,342
Feb.	43,695	18,920	3,093	3,591	6,641
Mar.	43,329	17,470	3,172	3,172	6,378
Apr.	42,642	15,660	3,404	3,407	6,469
June	40,184	20,240	3,274	3,727	5,885
July	38,681	21,190	2,996	3,781	5,982
Aug.	38,539	21,250	2,625	3,347	5,829
Sept.	36,346	21,040	2,246	2,834	5,823
Oct.	38,125	19,020	2,208	3,219	6,012
Nov.	36,363	20,000	2,229	3,565	5,530
Dec.	40,222		2,170		

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total	Per Cent Balloons		Total	Per Cent Balloons
1923	23,140,630	0.6	1928	24,247,282	81.6
1924	21,968,311	19.7	1929	24,141,502	89.3
1925	23,001,464	66.2	1930	17,364,094	80.1
1926	24,199,524	78.3	1931	11,253,800	76.7
1927	19,700,008	79.1	1932	6,004,252	78.7
1932			1932		
January	810,759	89.0	July	338,725	82.2
February	726,172	84.3	August	221,913	53.3
March	648,013	81.6	September	197,999	64.5
April	652,126	60.8	October	237,498	77.7
May	657,995	74.0	November	454,947	77.5
June	499,441	82.3	December	558,674	80.0

U. S. Tire and Tube Statistics

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1924	1925	1926	1927	1928	1929	1930	1931
Production	51,633	60,845	61,237	64,439	77,944	68,726	50,965	48,789
Shipments	50,120	59,262	59,002	64,059	74,296	69,395	53,638	48,151
Inventory[2]	7,427	8,142	10,456	10,264	13,624	11,838	9,003	110,238

Figures for Recent Months

	PRODUCTION 1930	PRODUCTION 1931	PRODUCTION 1932	SHIPMENTS 1930	SHIPMENTS 1931	SHIPMENTS 1932	INVENTORY 1930	INVENTORY 1931	INVENTORY 1932
Jan.	4,485	3,675	3,462	4,406	3,744	3,253	11,925	8,957	7,912
Feb.	4,555	3,985	3,871	4,195	3,402	2,553	11,410	9,536	9,172
Mar.	4,863	4,663	3,671	4,717	4,122	2,954	12,513	10,014	9,878
Apr.	5,648	4,944	3,517	5,089	4,932	3,698	13,076	10,031	9,846
May	5,717	5,679	3,820	5,216	5,415	4,258	13,432	10,312	9,379
June	5,122	5,672	5,643	5,294	5,572	10,065	13,277	10,447	4,999
July	3,991	4,926	3,617	5,447	5,462	2,404	11,812	9,919	6,203
Aug.	4,166	3,906	3,089	5,175	4,960	2,655	10,848	8,896	6,659
Sept.	3,365	3,172	2,539	4,405	3,932	3,082	9,812	8,158	6,096
Oct.	3,582	2,974	2,569	3,499	2,852	1,799	9,803	8,300	6,876
Nov.	2,654	2,500	2,304	2,834	2,887	1,711	9,595	7,919	7,454
Dec.	2,814	2,643	——	3,361	2,871	——	9,003	7,744	——

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1924	1925	1926	1927	1928	1929	1930	1931
Production	70,706	82,614	76,618	70,823	80,180	68,829	52,420	48,333
Shipments	68,106	81,004	71,591	72,896	77,127	70,592	54,938	50,021
Inventory[2]	11,052	11,313	16,200	13,692	16,117	12,807	9,999	112,121

Figures for Recent Months

	PRODUCTION 1930	PRODUCTION 1931	PRODUCTION 1932	SHIPMENTS 1930	SHIPMENTS 1931	SHIPMENTS 1932	INVENTORY 1930	INVENTORY 1931	INVENTORY 1932
Jan.	4,607	3,623	3,308	4,857	4,062	3,529	12,704	9,439	7,719
Feb.	4,634	3,916	3,821	4,337	3,400	2,728	13,036	9,921	8,760
Mar.	4,941	4,450	3,502	4,727	3,789	2,686	13,179	10,475	9,448
Apr.	5,510	4,617	3,225	4,848	4,636	3,385	13,784	10,413	9,441
May	5,535	5,413	3,409	5,074	5,281	3,867	13,852	10,549	8,918
June	4,950	5,358	5,279	5,265	5,397	9,019	13,612	10,504	5,174
July	3,939	4,955	2,937	5,855	5,831	2,160	11,667	9,589	5,975
Aug.	4,796	4,435	2,748	5,762	5,301	2,503	10,737	8,774	6,127
Sept.	3,817	3,449	2,601	4,541	4,150	3,098	10,065	8,095	5,753
Oct.	3,951	3,077	2,187	3,472	2,813	1,658	10,517	8,321	6,214
Nov.	2,680	2,443	2,005	2,788	2,594	1,578	10,313	8,119	6,662
Dec.	3,060	2,597	——	3,412	2,767	——	9,999	7,922	——

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% complete up until 1929 and 80% complete beginning with 1929, and that basis has been accepted when preparing the statistics in this table.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	United States Total	United States Passenger Cars	United States Trucks	Canada Total	Canada Passenger Cars	Canada Trucks	Grand Total
1926	4,298,799	3,808,753	490,046	205,002	164,483	40,609	4,503,891
1927	3,393,887	2,935,868	453,019	179,426	146,850	32,556	3,573,313
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932							
Jan.	119,344	98,785	20,541	3,731	3,112	619	123,075
Feb.	117,413	94,110	23,303	5,477	4,494	983	126,621
Mar.	118,959	99,399	19,560	8,318	6,604	1,714	127,277
May	185,149	157,756	27,393	8,221	7,269	952	193,370
June	183,092	160,330	27,754	7,112	6,308	804	190,204
July	111,139	94,705	16,434	7,472	6,773	699	118,611
Aug.	90,324	75,907	14,417	4,067	3,166	901	94,391
Sept.	84,141	64,748	19,393	2,342	1,741	601	86,483
Oct.	48,934	35,339	13,595	2,923	2,361	562	51,857
Nov.	59,556	47,532	12,024	2,204	1,669	535	61,860
Dec.	107,403	86,199	21,204	2,139	1,561	578	109,542
Total	1,370,728	1,135,541	235,187	60,816	50,718	10,098	1,431,544

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA[1]							DUTCH EAST INDIES[5]							
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon[2]	India & Burma[3]	Sarawak[4]	British North Borneo[5]	Siam[4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China[3]	Amazon Valley	All Other[6]	World Total[7]
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	12,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,292	792,203
1932	478,252	92,539	385,713	48,973	3,721	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,126	1,816	702,327
1931:															
Jan.	41,579	11,029	30,550	7,039	1,315	770	542	424	5,923	7,348	10,328	1,218	994	295	66,746
Feb.	41,951	9,672	32,279	6,365	1,041	945	542	409	4,869	7,206	9,001	1,018	1,271	217	65,163
Mar.	48,589	12,009	36,580	5,881	1,209	930	542	536	5,434	7,104	11,258	1,233	1,338	430	72,475
Apr.	43,453	9,977	33,476	4,333	641	788	455	340	6,473	6,063	8,759	327	629	333	62,617
May	44,281	10,479	33,802	4,242	622	869	455	413	7,373	6,799	10,955	793	1,110	382	67,814
June	39,397	12,115	27,282	5,098	1,086	1,138	455	337	5,856	6,696	11,380	1,019	621	351	61,319
July	43,658	11,995	31,663	4,517	715	801	536	316	6,671	7,511	10,711	859	1,565	186	66,051
Aug.	42,832	9,063	33,769	3,763	406	692	535	210	6,397	7,044	8,641	1,097	856	241	63,651
Sept.	44,336	8,369	35,967	4,029	169	701	535	218	5,577	7,358	8,389	917	745	183	64,788
Oct.	45,911	9,955	35,956	5,547	286	872	550	338	8,086	7,882	9,547	934	1,284	238	71,517
Nov.	48,012	9,529	38,483	4,609	408	830	550	390	7,351	8,174	7,981	731	872	233	70,612
Dec.	35,741	11,314	24,427	6,346	572	1,115	550	287	5,942	8,562	9,059	1,550	836	203	59,449
1932:															
Jan.	42,638	10,304	32,334	4,893	732	756	460	457	5,155	8,815	8,913	1,796	831	199	65,341
Feb.	42,008	8,008	34,000	4,533	803	696	460	334	4,814	6,011	6,534	1,060	352	203	59,300
Mar.	39,903	6,658	33,245	3,462	284	501	460	217	4,946	6,863	6,299	774	715	77	57,843
Apr.	36,670	4,682	31,988	3,210	365	459	345	130	6,722	6,090	4,935	962	487	99	55,792
May	40,297	5,677	34,620	3,824	304	595	344	118	6,552	6,551	6,012	964	416	278	60,578
June	36,566	5,665	30,901	3,444	359	481	345	166	5,610	7,516	5,507	1,218	394	139	56,080
July	40,723	5,346	35,377	3,501	99	442	400	184	5,779	6,257	6,145	1,233	232	141	59,790
Aug.	39,327	7,371	31,956	4,717	129	506	400	300	4,803	4,882	7,244	1,088	303	49	56,377
Sept.	41,973	8,869	33,104	5,129	122	614	400	340	3,858	6,485	7,664	1,621	318	78	59,733
Oct.	37,931	9,798	28,133	2,945	139	583	350	428	4,022	7,051	8,944	1,147	414	247	54,403
Nov.	40,098	10,072	30,026	4,146	185	683	350	371	4,368	6,250	9,080	809	1,164	156	57,588
Dec.	40,118	10,089	30,029	5,169	200*	644	350	406	4,683	7,066	8,594	1,211	500*	150*	59,002
1933:															
Jan.	46,599	7,857	38,742	4,641											

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927, 1,437 in 1928, 2,670 in 1929, and 1,274 in 1930. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 15 tons in 1923, 98 tons 1924, 6 tons 1925, 20 tons 1926, about ½ ton in 1927, and 1 ton in 1928, and practically none in 1929, 1930 and 1931. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons 1924, 2,239 tons 1925, 44 tons in 1926, 84 tons in 1927, 1,459 tons in 1928, 1,302 tons in 1929, and 2,656 tons in 1930. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands, and includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. *Figure is provisional; final figure will be shown when available.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States[1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (ed)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,534	6,295	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	349,300
1920	249,530	56,844	13,385	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,630
1922	296,594	11,724	24,352	27,546	9,207	11,984	6,430	2,493	2,643	172	—3 807	1,778	589	567	396,222
1923	401,527	12,700	27,392	18,519	13,277	11,372	8,489	2,986	1,649	2,184	792	2,528	830	1,128	409,178
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,270	416,302
1925	385,596	4,061	32,956	35,987	19,683	11,117	11,411	7,088	4,757	2,930	875	3,149	1,155	1,583	520,274
1926	399,981	34,865	34,240	22,775	20,229	18,125	9,209	6,529	9,021	2,498	2,670	4,046	1,299	1,270	617,987
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,345	36,498	37,355	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	522,698	122,675	55,023	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	364	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	48,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	52,383	42,506			56,027					2,851				
1931:															
Jan.	34,873	9,730	5,954	3,847	1,709	2,861	1,036	1,775	601	986	348	464	240	635	65,959
Feb.	32,572	12,226	4,510	3,374	1,927	3,264	1,393	1,022	495	785	157	476	201	366	62,768
Mar.	37,960	12,335	4,386	3,545	3,012	2,323	418	2,531	435	862	346	400	392	507	69,452
Apr.	42,212	9,440	4,346	3,054	2,070	3,478	523	1,450	457	515	333	495	208	324	68,910
May	33,271	8,212	2,880	3,231	2,748	3,755	1,023	1,034	884	1,153	86	495	180	711	58,663
June	43,730	5,636	4,002	3,504	2,112	2,988	1,462	3,279	1,112	1,058	272	577	207	607	70,546
July	42,293	5,366	3,801	3,226	2,592	3,065	809	3,141	627	1,507	41	429	145	1,074	67,316
Aug.	36,709	5,030	3,393	2,889	2,304	2,780	812	3,137	288	955	—57	321	160	413	60,129
Sept.	37,571	5,468	4,420	4,227	1,535	5,556	693	2,335	269	1,015	191	571	99	499	64,449
Oct.	39,820	5,775	3,909	3,220	1,567	3,980	571	4,076	765	792	185	710	193	695	66,253
Nov.	43,659	2,550	2,669	2,621	1,233	3,340	545	2,417	934	729	183	745	297	954	62,876
Dec.	51,323	4,402	2,696	2,950	2,452	5,093	859	4,474	787	652	135	677	283	932	77,715
1932:															
Jan.	32,028	3,248	2,588	3,303	1,746	5,782	627	3,258	622	521	479	840	462	197	55,701
Feb.	26,482	5,930	2,898	4,356	1,723	6,781	1,189	2,931	758	506	500	708	313	306	55,382
Mar.	43,361	3,585	2,482	3,436	2,588	5,398	1,423	2,745	1,211	721	112	456	359	844	68,821
Apr.	36,326	6,326	2,956	3,737	1,600	3,684	1,083	764	1,549	847	348	474	417	1,259	61,870
May	32,318	1,110	2,277	2,447	1,416	3,917	1,033	3,748	2,048	617	286	707	272	350	54,041
June	39,136	1,853	3,666	3,405	2,334	2,334	1,534	5,291	1,421	449	127	578	196	280	63,604
July	30,494	4,081	3,125	3,380	1,529	2,544	1,116	1,735	624	723	—214	784	258	1,207	51,386
Aug.	32,650	6,672	4,919	4,006	970	3,390	1,615	1,740	751	1,211	—66	611	210	557	59,236
Sept.	26,865	5,688	5,845	3,674	2,770	5,878	971	1,376	625	964	103	534	267	406	55,966
Oct.	34,748	4,627	4,715	4,177	1,207	5,653	510	1,853	569	627	553	537	489	986	61,251
Nov.	27,689	5,836	3,830	3,577	1,593	4,563	1,265	1,481	1,653	1,035	275	489	631	650	54,567
Dec.	31,246	2,927	3,205			5,603					348				

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1]United States imports of guayule are included in this compilation. *Figure is provisional; final figure will be shown immediately it becomes available.

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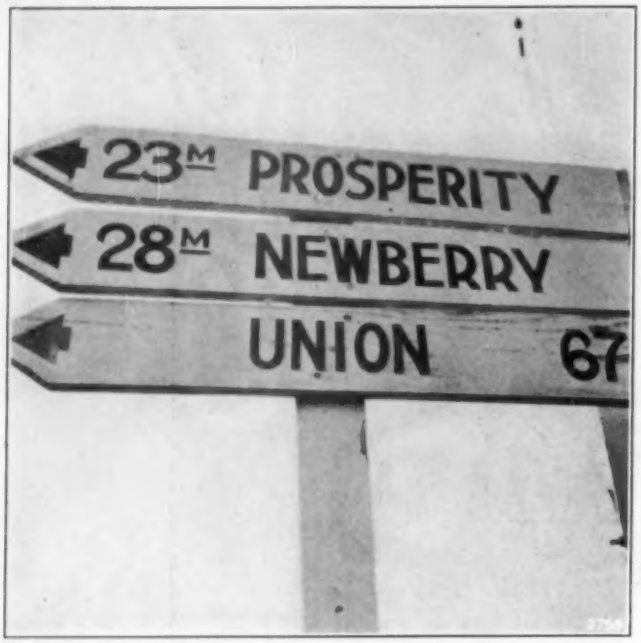

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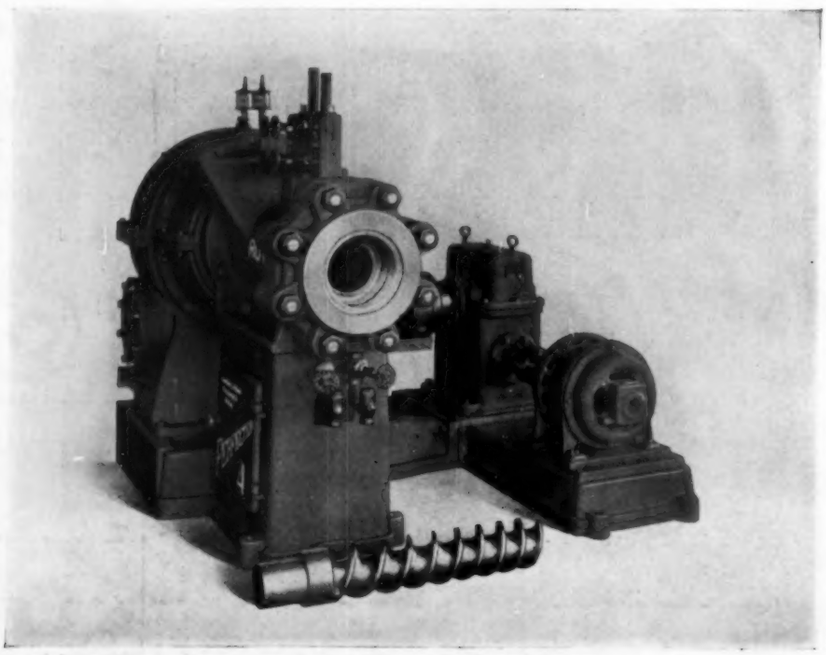

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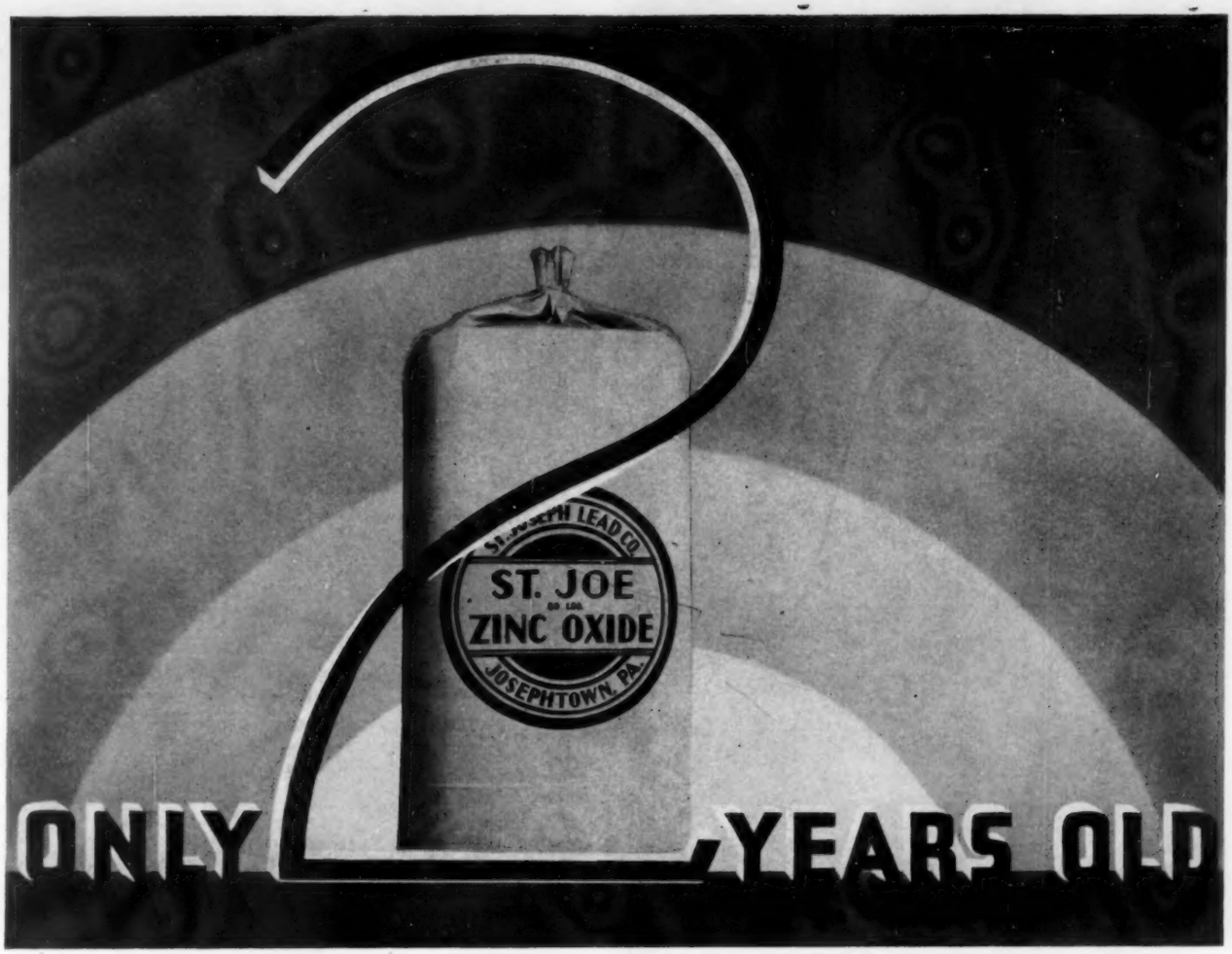

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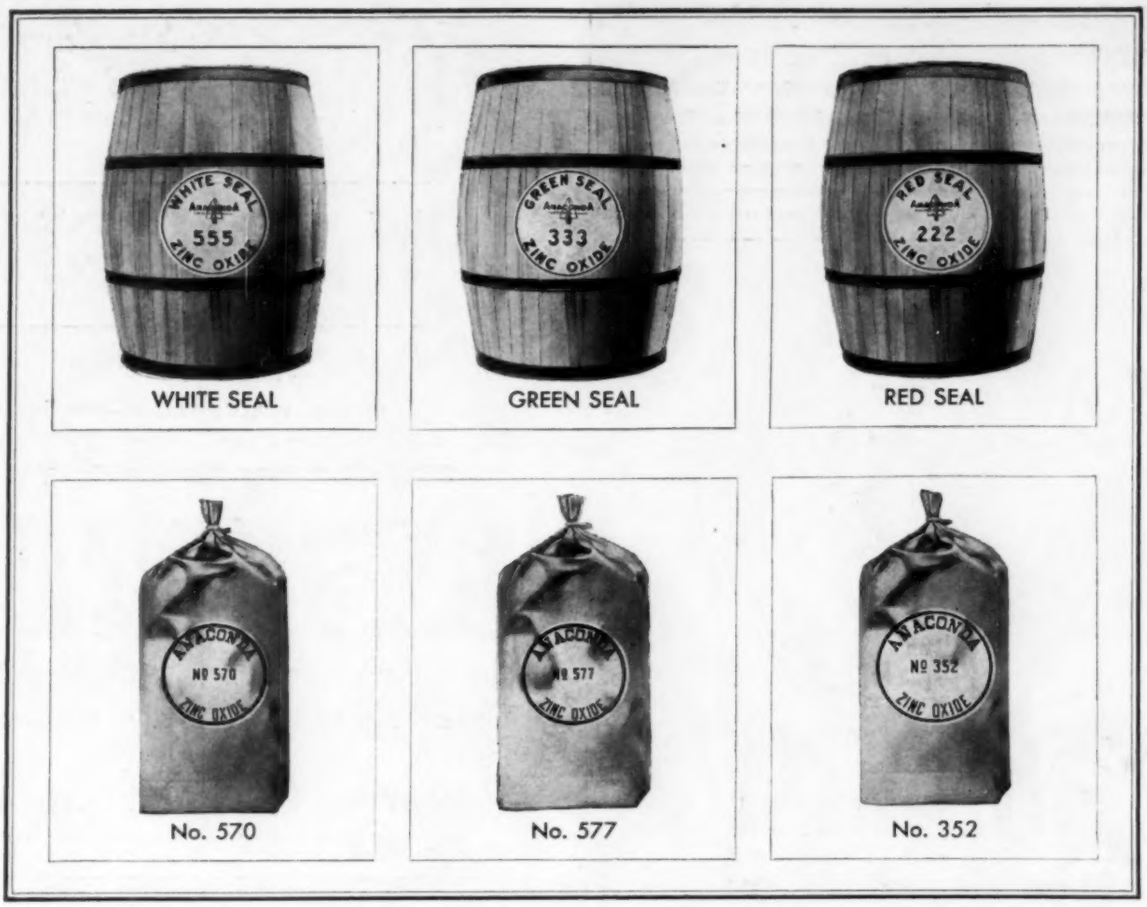

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